TOOL KIT FOR SOLID WASTE MANAGEMENT

INTERMOUNTAIN REGION - NATIONAL PARK SERVICE

Environmental Protection Agency Region VIII
National Park Service
Intermountain Region

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Documents:
See **Toolbox 6** for EPA and NPS solid waste resource documents.
NPS Solid Waste Management Handbook, 1996
Greening of the Government Guide

For Hazardous Waste:
NPS Hazardous Waste Management Handbook and *NPS Pollution Prevention and Community Right-to-Know Training Manual*
NPS *Environmental Compliance Information System* (ECIS)

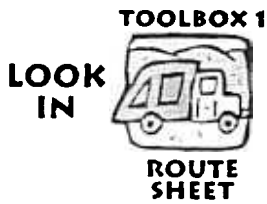
HOW TO USE THIS TOOL KIT

This manual contains the tools and information you will need to build a solid waste management program, including collection, landfilling, recycling, reuse, education, and waste reduction components.

The Tool Kit is designed as a companion document to the *NPS Solid Waste Management Handbook*, 1996, which contains more detailed information, examples, and resources for solid waste management programs. For a copy of the *Handbook*, contact Dr. Michael Schene, Environmental Program Manager, Intermountain Region, at **mike_schene@nps.gov**.

When you see this symbol throughout this Tool Kit, you can refer to the appropriate chapter or appendix in the *NPS Handbook* for more detailed information about the topic.

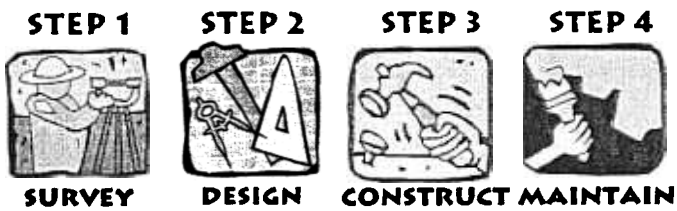
These symbols direct you to other pages in this Tool Kit where you will find related information, instructions, or worksheets.



Additional tools and resources are included in the "toolboxes" at the end of this manual When you see these symbols throughout this Toolkit, you can refer to the appropriate toolbox for additional tools.

HOW DO I BEGIN?

The Tool Kit is organized in sequence for building a solid waste management program Each step in the sequence is a separate section of the Tool Kit, identified with these symbols:



If you are developing your solid waste management program from scratch or preparing a solid waste program document, work through each section in order and refer to the resources and the *NPS Handbook* as noted.

This Toolkit will give you a broad framework for building and maintaining your Integrated Solid Waste Alternatives Program (ISWAP). You can use it to plan a new program or fine-tune a program that's already under way. If you're just beginning, use each of the tools in the tool kit to evaluate the alternatives available to you, then develop a fairly complete first draft of your plan. You'll want to present your draft to management for review and approval, then use the tool kit to work out recommended revisions and finalize your detailed plan for the alternatives you select.

If you have already completed some of the steps or are reevaluating an existing program, just skip to the relevant sections and proceed from there.

INTRODUCTION TO SOLID WASTE MANAGEMENT

WHAT IS SOLID WASTE MANAGEMENT?

In the context of this document, solid waste includes all the solid materials generated in the parks, such as durable goods (appliances, furniture), non-durable goods (single-use, disposable products), containers and packaging, food wastes, yard wastes, and miscellaneous inorganic wastes (ceramic, rock) from residential areas, commercial and institutional operations, and public areas in a park.

While the definition of solid waste does ***not*** include hazardous wastes, such as spent industrial cleaners and solvents, paints, used oils, etc. Household hazardous wastes are often discarded along with other wastes and thus may be expected in small quantities in any load of mixed waste, and sometimes even in source-separated recyclables and compostables.

Solid waste does ***not*** include sewage sludge or wastewater.

Solid waste management is any of the work and programs to eliminate, collect, recycle, or landfill solid waste. These programs include efforts to reduce waste and reuse materials, as well as recycling, composting, trash collection, landfilling, and incineration. Procurement of recycled-content supplies and equipment and education are also part of solid waste management.

Integrated solid waste management considers all of the work and programs in solid waste as part of one system. By considering solid waste management as an integrated system, you can recognize that spending money on one program may save even more money in another program. For example, a little money spent on public education could save a lot of money on litter collection, reducing overall solid waste management costs. The Environmental Protection Agency has established a hierarchy of solid waste management practices that places the highest priority on source reduction and reuse, followed by recycling and composting, then by waste-to-energy, and finally landfilling.

Advantages to your park of integrated solid waste management:

ENVIRONMENTAL BENEFITS

- prevents waste
- reduces waste sent to the landfill, which may have negative impacts on groundwater and air quality
- saves energy, which reduces consumption of oil and gas and reduces air pollution
- supports the National Park Service role as wise stewards of the land and its natural resources

SAFETY BENEFITS

- improved services and increased monitoring of solid waste management practices reduces lifting, handling and other potentially injurious or dangerous practices.

ECONOMIC BENEFIT$

- increased efficiency reduces costs and saves staff time
- reduced trash volumes reduces collection and landfilling costs
- improved services means greater value for same cost
- an integrated solid waste alternatives plan will help you get budget money to implement solid waste management and diversion programs from NPS, and potentially allow you to benefit from additional money and participation from other partners in your solid waste management system.

EDUCATIONAL BENEFITS

- demonstrates to visitors and decision-makers your good stewardship of natural resources
- encourages visitors to participate in preserving the environment both in the park and in their own communities

YOUR GOAL

The NPS has developed an Integrated Solid Waste Alternatives Program (ISWAP) to provide coordination and guidance to parks on integrated solid waste management practices. The priorities of this program are developing park ISWAP plans, developing waste reduction and reuse efforts, promoting buy-recycled practices, increasing public education supporting solid waste alternatives, and developing park recycling programs.

The NPS has also adopted three system-wide goals in response to 1993 Executive Order 12873 (Federal Acquisition, Recycling and Waste Prevention, October 20, 1993), which mandates ". . . waste prevention and recycling in [each] Agency's daily operations and work to increase and expand markets for recovered materials through greater federal government preference and demand for such products." The three NPS national goals are

Goal #1: *By September 30, 1998, complete a study of the Integrated Solid Waste Management Opportunities (Alternatives) available at the Park. Develop ISWAP Plans, of varying complexity, to supplement the study.*

Goal #2: *By 2002, achieve a 5% decrease in total solid waste levels (including both trash and recyclables) from the amount generated in the parks in 1998.*

Goal 3#: *By 2002, recycle and/or compost at least 40% of all waste materials generated in the parks that year, and each year thereafter. In states where the recycling and/or composting rate has been set at a level higher than 40%, the higher rate shall be used as the park's goal.*

Your goal is to build an integrated solid waste management program that minimizes the amount of solid waste generated at your park and improves the efficiency of collection and management of the solid waste that is generated. Use this toolkit to help you build your ISWAP program and document your program.

By documenting your program, you can meet the first goal to develop a plan. The degree to which your park's solid waste program can meet the second two goals will depend on your location, available markets and resources, and what is reasonable to achieve given your park's specific circumstances. Improving your solid waste program will move your park and the entire National Park system closer to meeting all three goals.

On September 14, 1998, Executive Order 13101 was signed, which strengthened the federal government's commitment to waste prevention, recycling and federal acquisition of recycled products. Executive Order 13101 also requires each federal agency to establish goals for solid waste prevention, recycling or diversion, to be achieved by January 1, 2000, and to establish long range goals to be achieved by 2005 and 2010. Goals for increasing procurement of products made with recovered materials and environmentally preferable products and services. These goals are to be incorporated into each agency's Government Performance Results Act (GPRA) annual performance plans.

INTERMOUNTAIN REGION GOALS

To promote the NPS ISWAP program and its goals, and to maintain consistency in complying with the requirements of Executive Order 13101 and GPRA, the Intermountain

Region has developed regionally-specific goals for parks in this region to use in developing their ISWAP plans and information. The three Intermountain Region goals are:

Goal #1: *By 2000, Intermountain Parks will have completed a Waste Generation and Waste Composition Baseline Profile; Parks will use these data to identify the need for development of an Integrated Solid Waste Management Alternative Program plan.*

Goal #2: *By 2005, Intermountain Parks will achieve a 5% decrease in total solid waste levels (including both trash and recyclables) from the amount generated in the parks in 2000.*

Goal 3#: *By 2005, Intermountain Parks will recycle and/or compost at least 25% of all waste materials generated in the parks that year, and each year thereafter.*

To meet these goals, you will build an integrated solid waste management program that minimizes the amount of solid waste generated at your park and improves the efficiency of collection and management of the solid waste that is generated. Use this toolkit to help you build your ISWAP program and document your program.

By documenting your program, you can meet the first regional goal to develop a Waste Generation and Waste Composition Baseline Profile. The manner in which your park's solid waste program meets the second two regional goals will depend on your location, available markets and resources, and what is reasonable to achieve given your park's specific circumstances. Improving your solid waste program will move your park and the entire National Park System closer to meeting all three regional goals, and help your park and the National Park Service comply with the requirements of the Government Performance and Results Act.

BUILDING YOUR INTEGRATED SOLID WASTE ALTERNATIVES PROGRAM

TOOLS AND TECHNIQUES FOR BUILDING AN ISWAP BY HAND

Building your ISWAP can be compared to building a house. Several distinct activities must take place, and you need the right tools at each step along the way. First, you survey the land the house will be built on. Next, you design the house to fit the land's characteristics and your budget, then build the house, and finally move in and maintain it.

STEP 1

LOOK IN

SURVEY

Those same steps also apply to your ISWAP. First, you **survey** your existing solid waste management practices and programs to determine waste generation and composition and to determine what you have to build upon. **STEP 1: SURVEY** describes the tools to do these activities.

STEP 2

LOOK IN

DESIGN

Then you **design** new solid waste management practices and programs to meet your new goals. **STEP 2: DESIGN** describes the tools used to design your program.

STEP 3

LOOK IN

CONSTRUCT

After you have your design, you can **construct** your new solid waste management programs and make them operational. **STEP 3: CONSTRUCTION** describes the tools to do these activities.

STEP 4

LOOK IN

MAINTAIN

Finally, you will **maintain** your solid waste management programs, to keep them operating efficiently. These tools are described in **STEP 4: MAINTENANCE**.

STEP 1: SURVEY

What is the Survey?

The survey is the first step in constructing your solid waste management system. The survey identifies what your current situation in solid waste management is, and what you have to build upon. The survey tools include **estimating the cost of the solid waste management system, estimating waste generation, estimating the waste composition, calculating how much of your solid waste is being diverted (recycled and/or composted) and describing all of your current solid waste management programs.** Each of these tools is described in this section.

Cost Estimates of the Solid Waste Management System

The cost estimate shows you your current costs and revenues for the solid waste management system. While you already have overall maintenance cost estimates, you should also be able to prepare a separate estimate of solid waste costs distinct from other maintenance departments. The benefits are:

- **tracking complete costs** for solid waste will help justify budget requirements
- **documenting complete costs** will let you charge accurate fees for services, track future savings and demonstrate improvements in efficiency;
- **tracking solid waste and recycling costs separately** will help demonstrate savings and revenues from recycling and other diversion programs.

TOOLS FOR ESTIMATING SOLID WASTE MANAGEMENT COSTS IN PARKS

Estimating Costs

The following table lists the major cost categories you should be able to track for solid waste management programs in your park. These can be annual costs or fiscal year costs, depending on your park's accounting practices.

COSTS	
Labor including:	
Roadside Collection Labor	$
Compactor Truck Collection Labor	$
Other Labor	$
Solid Waste Disposal	$
Contract Fees	$
Service Fees (Revenues from Collection Services)	$
Equipment including:	
Vehicle Operation & Maintenance Cost	$
Vehicle Purchase or Amortization/Depreciation Cost	$
Container Maintenance	$
Container Purchase or Amortization/Depreciation Cost	$
Materials including:	
Trash Bags	$
Signs	$
Educational Materials	$
Concessionaire Costs	$

- **All of the cost categories** can also be tracked separately for a recycling collection program, or composting collection program.
- **For a recycling program**, any revenues from the sale of recyclable materials should also be tracked.
- **In addition to revenues**, avoided costs can be estimated and added to your program's revenues. You may have avoided costs by conducting source reduction and reuse programs. You may avoid disposal costs by source reduction — by not creating materials that must be disposed of later — and you may avoid the purchase cost of new materials by reusing old or recovered materials.

Separating Costs

Your current accounting system may not separate solid waste management costs from other maintenance department costs. And your maintenance staff and equipment may be used for a number of maintenance activities, including solid waste management activities. How do you separate solid waste management costs from other maintenance costs?

- **If your park uses a maintenance tracking system** such as MMP (Maintenance Management Program) or MMS (Maintenance Management System), new activity codes can be used to separately track solid waste management activities. The *Handbook* includes an example of using MMP with new activity codes in **Appendix H**.
- **If your park uses MMS**, you can use new activity codes or new location codes for separate tracking of solid waste management costs. A new activity code, such as "Garbage Collection, 3291" will allow you to include labor, materials and equipment costs associated with garbage collection activities. Separate codes for recycling collection can also be used to separately track recycling costs.
- **If your park uses another system**, you can separate costs "manually" by estimating how much time and materials are used for solid waste management activities. If maintenance staff spend a portion of their time on solid waste collection, estimate the percent time and split their salary and benefits costs by that percentage. You may also want to include a percentage split of overhead costs. If vehicles or other equipment are used for solid waste management activities, estimate the percent time and split their operating and maintenance costs, as well as amortized purchase or depreciation costs, by that percentage.

EXAMPLE

Grand Teton National Park used their cost tracking system to identify cost saving ideas and to justify budget allocation for equipment purchase. By separately tracking solid waste collection labor costs, they showed that the cost of two laborers to ride on the rear of a packer truck was around $18,000 per year plus housing space, for each truck. The "shotgun packer riders" could be replaced by a camera-operated truck vision system, at an equipment cost of around $1,500 plus installation, with a savings in the first year of about $15,000. By tracking their costs, Grand Teton National Park was able to identify a way to reduce the collection costs and demonstrated the advantages of purchasing new equipment.

FIRST TERMS, THEN MORE TOOLS

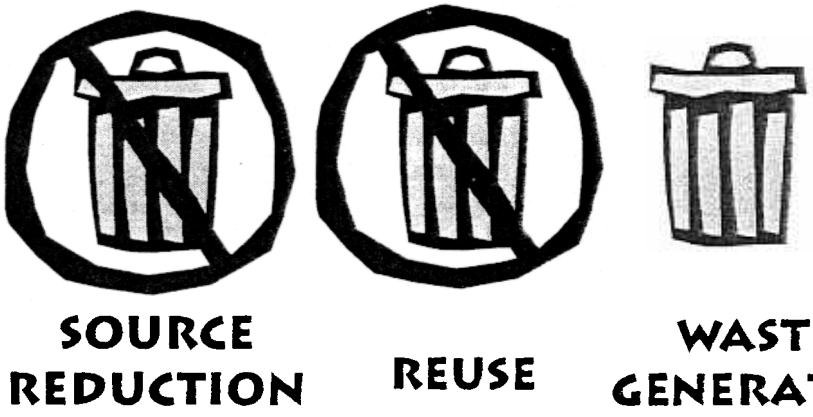
A **waste generation estimate** is an estimate of how much solid waste is created in your park. This includes solid waste from park operations, from visitors, and from concessionaire operations within the park. Knowing how much waste is generated will allow you to track future waste quantities. It is the first step in surveying your solid waste programs for building improvements.

Source reduction and **reuse** are ways to keep waste from being created or generated. "Source reduction" means reducing the quantity or toxicity of solid waste at its source—in this case, your park. It includes the design, manufacture, purchase, or use of materials (such as products and packaging) to reduce the amount or toxicity of garbage generated. Source reduction can help reduce disposal and handling charges because it avoids the costs of recycling, municipal composting, landfilling, and combustion.

Reuse is a component of source reduction that involves using materials again in their original form, often in creative but practical ways. The blank side of used office paper can be used for scratch pads, for example, or foam egg cartons can be used in the park maintenance shop to store small hardware items. Even old wood and other building materials can often be put to good use in new construction in the park.

As spelled out in Regional Goal 2, by 2005 parks must reduce by an additional 5 percent the amount of waste generated in 2000. The amount of waste generated includes both trash and materials diverted for recycling, and should be divided by the total visits for that year to show the pounds of waste generated per visitor. In this way the waste generation rate will not be affected by an increase or decrease in visits to your park.

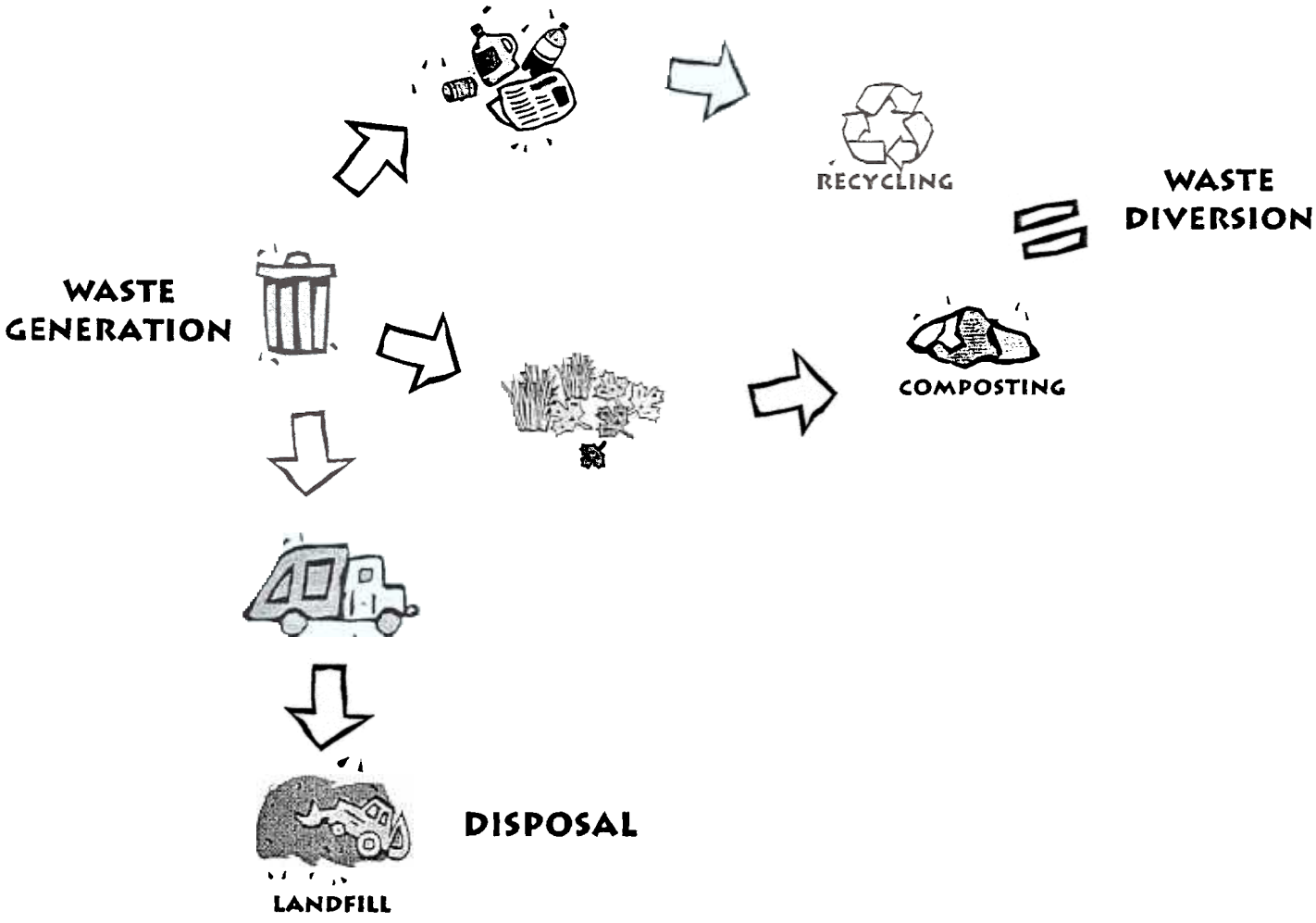
Waste diversion means removing material from the waste stream that would otherwise end up in a landfill. Wastes may be diverted in many ways, including recycling and composting.



Recycling is the collection, separation, processing, and remanufacture of materials in the solid waste stream to make new products.

Composting is the collection, and processing of organic materials in the solid waste stream to break down the materials through bacterial decomposition to reduce volume and to create a usable soil amendment product, called compost. Composting is considered a form of recycling.

Waste is the portion of the solid waste generated that is sent to the landfill. It does not include any solid waste materials that are diverted from the landfill by recycling or composting.


RECYCLING
WASTE DIVERSION
WASTE GENERATION
COMPOSTING
DISPOSAL
LANDFILL

TOOLS FOR ESTIMATING WASTE GENERATION IN PARKS

How to Use the Tools

You can use a number of methods to estimate how much waste is generated in your park The best method is the one that gives you the most accurate estimate for the least effort.

You will need to estimate the *tons per year* of solid waste generated in your park. Weight-based estimates like *tons per year* give you accuracy, let you compare year to year and material to material, and let you calculate diversion, reduction, and landfilling rates.

Volume is a function of how your solid waste is collected: in cans, toters, Dumpsters®, and rolloff containers. The key to good estimating is to accurately convert *volume* (cans, toters, Dumpsters®) to *weight (tons per year)*.

Chapter III of the *NPS Handbook* lists five different waste generation methods. Each method uses different information to make the estimate, and each method will be better for some parks than others. How do you decide which method to use?

Review the methods for estimating solid waste generation listed below. If you can answer yes to each question, that method may work for you.

Method 1: Contractor Estimates

This method uses your solid waste collection contractor to make the estimates

Questions:

- ✓ **If you use a contract hauler, does the contractor collect all the solid waste generated in the park? If not, who collects the rest?**
- ✓ **Does the contractor collect solid waste from inside the park in separate routes and trucks, without collecting waste from other customers at the same time? If not, can he track each source separately?**
- ✓ **Does the contractor have access to scales to accurately weigh your collected solid waste in each truck?**

How to Use Method 1: If you answered yes to all the questions, you can ask (or contractually require) your contractor to provide records of the quantity of solid waste collected. See your procurement officer to change contractor contracts to include this requirement. The contractor should provide complete records throughout the year to account for seasonal variations in solid waste generation in your park. Monitor the contractor's activities and the estimates, and know how to verify the accuracy of the contractor's estimate.

METHOD 2: LANDFILL WASTE TICKET ESTIMATES

This method uses the weight receipts from your landfill to estimate the quantity of solid waste.

Questions:

- ✓ **Do you or does your contractor collect all the solid waste generated in the park? If not, who collects the rest?**
- ✓ **Do your or your contractor collect solid waste from inside the park in separate routes and trucks, without collecting waste from other customers at the same time?**
- ✓ **Do you or your contractor have access to scales at the landfill to accurately weigh your collected solid waste in each truck?**

How to Use Method 2: If you answered yes to all the questions, arrange to receive the scale tickets for all of your park's solid waste collected. Keep and track the quantities listed on the tickets, recording the date, quantity (in tons if possible), and vehicle identification (to record where the solid waste came from). Track the weights for an entire year if possible to account for seasonal variations in solid waste generation in your park.

PREFERRED

METHOD

METHOD 3: AVERAGE VOLUME PER CONTAINER

For most parks, this method will provide the most accurate estimates. It will tell you where the solid waste is being generated, and how much. This method uses information collected by the truck drivers while they are collecting solid waste, so they need to record the size and fullness of each container on that day.

Question:

- ✓ **Can park staff or your contractor's drivers complete a form while on their collection routes?**

How to Use Method 3: If you answered yes to this question, develop a route survey form like the one on page 15 for drivers to record the size, number, and level of fullness (percentage) for all solid waste containers collected. Train your drivers (or the contractor's drivers) how to fill out the route sheet accurately. You may need to require the contractor to provide the route sheets as a part of the contract. See your procurement officer to change contractor contracts to include this requirement. You can track all routes throughout the year for the most accurate estimate, or just complete route sheets one week per month to get a representative estimate with less effort. Whichever approach you use, be sure to conduct periodic spot checks to make sure your contractor is reporting quantities accurately.

METHOD 4: MAINTENANCE MANAGEMENT PROGRAM TRACKING SYSTEM

This method uses information collected by the park if it has a computerized tracking system to track costs.

Questions:

✓ **Do NPS crews perform all solid waste collection in the park?**

✓ **Does the park use the Maintenance Management Program (MMP)-based system for tracking solid waste management costs?**

LOOK IN HAND 

BOOK

How to Use Method 4: If you answered yes to both questions, see **Appendix H** of the *Handbook* for details on how to track solid waste with the MMP program.

Method 5: Average Pounds per Visitor

This method uses an average generation rate for visitors to estimate the quantity of solid waste.

Question:

✓ **Does your park have accurate records of visitor rates?**

How to Use Method 5: If you answered yes to the question and you cannot use any of the other, more accurate methods, use an average rate from another park. The following are "average pounds per visitor" rates determined for other parks. Select a park that is most similar to yours in size, facilities, and visitor patterns to get the most appropriate rate, or average the rate from several parks.

Grand Canyon	**1.31 lbs/visitor**
Prince William Forest	**2.54 lbs/visitor**
Yosemite	**2.70 lbs/visitor**
Rocky Mountain	**1.42 lbs/visitor (1996)**
Bryce Canyon	**0.61 lbs/visitor (1996)**
Glen Canyon	**2.76 lbs/visitor (1996)**

Because of the possibility of encountering hazardous materials in solid waste, consult with your Park Safety Officer and Hazardous Materials Coordinator for safety procedures before conducting the field sort.

TOOLBOX 4
GO TO

GUIDE

- Typical categories include paper, plastic, metals, glass, wood, food waste, and miscellaneous. **Note**: the example forms show only broad categories; depending on your waste stream, you may want to break down materials into subcategories of paper, plastics, metals, and organics. The reproducible worksheet in **Toolbox 4** provides these subcategories. You can also print the worksheet from the computer file in **Toolbox 5, Floppy Disk**.

TOOLBOX 5
GO TO

FLOPPY DISK

Name			Date
Material	Sample 1 (lb)	Sample 2 (lb)	Average (lb)
Paper			
Plastic			
Glass			
Metals			
Organics			
Other			

- The basic steps to conducting a field sort are

A. Determine the location and number of samples to sort

B. Pick all samples from the same location if you want to determine the composition of one operation, such as campground waste. Pick samples from a variety of locations if you want to determine an average, or overall composition.

C. With proper safety and weighing equipment, select a sample, empty the container, open bags and spread out the contents, sort them by material category and weigh each sorted material.

D. Record the weight data and prepare an analysis of the totals, averages and individual materials category percentages, and any other statistics of interest.

TOOLBOX 4

JIDE

A **Dumpster Diving Guide** with more details on the steps to conducting a field sort is included in **Toolbox 4**.

Park staff can conduct a field sort, or you can hire a contractor to do it. A university, solid waste hauler, or consultant could be a suitable contractor, but should have experience and capabilities to perform a field sort accurately.

PREFERRED METHOD

The Combined Composition Estimate—Medium Accuracy

This method is an analytical estimate that involves no field sorting, and is not dependent on the time of year the estimate is made. Using composition estimates from other field sorts and other studies, you assume a waste composition for each operation in the park (such as park offices, campgrounds, restaurants, retail stores, and hotels). With this information and an estimate of how much of the total waste stream is generated by each operation, you can develop a combined solid waste composition estimate. For more information on this estimating method, see **Chapter II** of the **NPS Handbook**.

LOOK IN HAND BOOK CH II

TOOLBOX 2 GO TO COMPOSITION

The example on the following pages shows how to make a combined composition estimate, and **Toolbox 2,** contains a blank worksheet to use in making this estimate for your park.

This method will also tell you who are the major generators of solid waste in the park, what are the most common materials, and where they are generated. This will help you when you design your new programs, and it is explained further in the Design section.

GO TO P 24

The Visual Survey Low Accuracy

Like a field sort, visually sorting waste separates materials into different categories. Typical categories include paper, plastic, metals, glass, wood, food waste, and miscellaneous. A visual sort is different from a field sort in that you just look at the solid waste sample to estimate how much is in each material category. This method is therefore much easier, faster, and cleaner than a field sort, but not as accurate.

TOOLBOX 6 GO TO RESOURCES

Park staff or contractors that collect solid waste on a regular basis probably do this informally during their collection routes, so they probably have a general idea of what materials are in the solid waste. To conduct a visual sort more systematically, use the same forms as are used in the field sort. See **Toolbox 6, Resources.**

Use two or more people to look at a sample of solid waste in a can, Dumpster® rolloff, or truck. Spread the waste in a thin layer, so you can easily identify all the components. Pick a material from the list and have everyone estimate the percentage of that material Average your results and enter the percentage as the estimate for that material.

Proceed through the list of materials, adjusting the estimates as you go along, to match with what you see. This approach works best with only a few categories. It is useful for checking a specific material, such as aluminum cans for recycling, to verify that your solid waste contains a reasonable quantity of that material.

TOOLS AND RESOURCES

SAMPLE ROUTE SHEET: METHOD 3, AVERAGE VOLUME PER CONTAINER

You can create a route sheet like the one below for each solid waste collection route in your park. Before giving the sheet to the driver, fill in the name of the route, all the container locations, and the container sizes for the route. If you don't have size and weight information on containers in your park, use the typical values in the conversion factors table (bottom of this page) for your estimates. The drivers can fill in the date and the percentage full for each container as it is emptied.

ROUTE				DATE
Container Location	**Container Type, Size (CY)**	**No. of Containers this Location**	**Estimated Percent Full**	**Total for this Location**
Longs Peak CG, #1	2 CY Dumpster	1	*75*	2 X 1 X .75 = 1.5
Longs Peak CG, #2	2 CY Dumpster	1	*70*	2 X 1 X .70 = 1.4
Longs Peak CG, #3	2 CY Dumpster	1	*100*	2 X 1 X 100 = 2.0
Lily Lake VC	32 gal. can	2	*100*	.15 X 2 X 100 = .30
Tuxedo Park	2 CY Dumpster	4	80	2 X 4 X .80 = 6.4
			TOTAL	11.6 CY

You will need to train the drivers how to estimate percentages and fill out the form accurately. As a training exercise, take the drivers out on a route and have each one visually estimate how full some of the containers are, then accurately measure the contents and compare everyone's guesses with the actual volume. Repeating this exercise a few times should give everyone a good basis for estimating volumes more accurately.

GO TO TOOLBOX 1 ROUTE SHEET

Toolbox 1, Route Sheet, has a blank version of the form that you can photocopy and customize for the routes in your park. An electronic version of the route sheet is also included on the diskette in **Toolbox 5**.

OTHER CONVERSION FACTORS

GO TO TOOLBOX 5 FLOPPY DISK

If you don't have size and weight information on containers in your park, you can use these typical values for your estimates.

- 1 Cubic Yard = 202 gallons
  - 32 gallon can = 0.15 cubic yards
  - 60 gallon toter = 0.30 cubic yards
  - 90 gallon toter = 0.45 cubic yards

- Compaction ratios for trash
  - 3:1 (typical)
  - 4:1 (higher-compaction vehicles)
- Compacted trash = 600 to 1100 lbs/CY, average 800 lbs/CY
- Yellowstone's estimate of compacted trash = 500 lbs/CY

HAND LOOK IN BOOK

See **Appendix E** of the NPS *Handbook* for more conversion factors.

WASTE COMPOSITION ESTIMATES

FIRST TERMS, THEN TOOLS

A waste composition estimate is an approximation of the materials and proportions of materials in the solid waste collected. Typical materials categories include paper, plastic, metals, glass, wood, food waste, and miscellaneous. A waste composition estimate can be done for one part of the park, such as solid waste from park operations, from visitors, or from concessionaire operations within the park; or the composition estimate can be done for the entire park. Knowing the composition of the solid waste will allow you to identify materials that could be diverted to recycling and composting programs, and knowing the composition from a particular part of the park will allow you to design recycling and composting program for that specific part.

TOOLS FOR WASTE COMPOSITION ESTIMATES

Three methods can be used to estimate the composition of solid waste in your park. Knowing the materials that make up your park's trash is essential to designing your solid waste management program. The methods involve different levels of effort or cost and may depend on whether or not you use a contractor to develop the estimate. The best method is the one that gives you enough information at the lowest effort or cost.

Review the methods listed below. Select the level of accuracy you need and pick the most cost-effective method for your park.

THE FIELD SORT METHOD—HIGH ACCURACY

A field sort involves physically separating solid waste into different materials categories.

- Because of the possibility of encountering hazardous materials in solid waste, consult with your Park Safety Officer and Hazardous Materials Coordinator for safety procedures before conducting the field sort.

GO TO TOOLBOX 4 GUIDE

- Typical categories include paper, plastic, metals, glass, wood, food waste, and miscellaneous. **Note**: the example forms show only broad categories; depending on your waste stream, you may want to break down materials into subcategories of paper, plastics, metals, and organics. The reproducible worksheet in **Toolbox 4** provides these subcategories. You can also print the worksheet from the computer file in **Toolbox 5, Floppy Disk.**

GO TO TOOLBOX 5 FLOPPY DISK

Name			Date
Material	Sample 1 (lb)	Sample 2 (lb)	Average (lb)
Paper			
Plastic			
Glass			
Metals			
Organics			
Other			

- The basic steps to conducting a field sort are:

A. Determine the location and number of samples to sort

B. Pick all samples from the same location if you want to determine the composition of one operation, such as campground waste. Pick samples from a variety of locations if you want to determine an average, or overall composition.

C. With proper safety and weighing equipment, select a sample, empty the container, open bags and spread out the contents, sort them by material category and weigh each sorted material.

D. Record the weight data and prepare an analysis of the totals, averages and individual materials category percentages, and any other statistics of interest

GO TO TOOLBOX 4 GUIDE

A **Dumpster Diving Guide** with more details on the steps to conducting a field sort is included in **Toolbox 4**.

Park staff can conduct a field sort, or you can hire a contractor to do it. A university, solid waste hauler, or consultant could be a suitable contractor, but should have experience and capabilities to perform a field sort accurately.

PREFERRED METHOD

The Combined Composition Estimate—Medium Accuracy

This method is an analytical estimate that involves no field sorting, and is not dependent on the time of year the estimate is made. Using composition estimates from other field sorts and other studies, you assume a waste composition for each operation in the park (such as park offices, campgrounds, restaurants, retail stores, and hotels). With this information and an estimate of how much of the total waste stream is generated by each operation, you can develop a combined solid waste composition estimate. For more information on this estimating method, see **Chapter II** of the **NPS Handbook**.

LOOK IN HAND BOOK CH II

TOOLBOX 2 GO TO COMPOSITION

The example on the following pages shows how to make a combined composition estimate, and **Toolbox 2,** contains a blank worksheet to use in making this estimate for your park.

This method will also tell you who are the major generators of solid waste in the park, what are the most common materials, and where they are generated. This will help you when you design your new programs, and it is explained further in the Design section.

GO TO P 24

The Visual Survey—Low Accuracy

Like a field sort, visually sorting waste separates materials into different categories. Typical categories include paper, plastic, metals, glass, wood, food waste, and miscellaneous. A visual sort is different from a field sort in that you just look at the solid waste sample to estimate how much is in each material category. This method is therefore much easier, faster, and cleaner than a field sort, but not as accurate.

TOOLBOX 6 GO TO RESOURCES

Park staff or contractors that collect solid waste on a regular basis probably do this informally during their collection routes, so they probably have a general idea of what materials are in the solid waste. To conduct a visual sort more systematically, use the same forms as are used in the field sort. See **Toolbox 6, Resources**.

Use two or more people to look at a sample of solid waste in a can, Dumpster® rolloff, or truck. Spread the waste in a thin layer, so you can easily identify all the components. Pick a material from the list and have everyone estimate the percentage of that material. Average your results and enter the percentage as the estimate for that material.

Proceed through the list of materials, adjusting the estimates as you go along, to match with what you see. This approach works best with only a few categories. It is useful for checking a specific material, such as aluminum cans for recycling, to verify that your solid waste contains a reasonable quantity of that material.

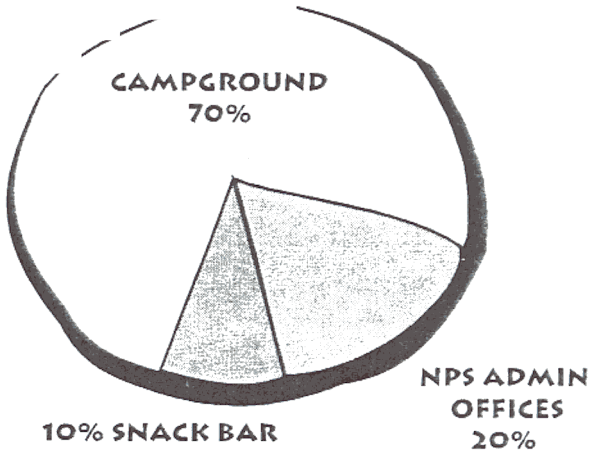
GO TO TOOLBOX 6 RESOURCES

OTHER TOOLS AND RESOURCES

The *EPA Business Guide for Reducing Solid Waste* contains a detailed description of how to conduct a field sort. Call the RCRA hotline at (800) 424-9346 and ask for document 530-K-92-004. EPA resources are listed in **Toolbox 6**.

CALCULATE A "COMBINED" WASTE COMPOSITION

Example: This park has estimated its total waste stream to be 1,000 tons per year. The three primary waste generators are estimated to produce



A Calculate the fraction of the total waste stream created by each generator in tons.

B Calculate the waste composition for each generator **(% x B)**.

C Calculate the combined waste composition for the entire park (add up each material).

Convert to percentage estimate **(C** ÷ total waste stream)

	NPS Admin Offices 20% of waste stream = **A** tons		*Campground* 70% of waste stream = **A** tons		*Snack Bar* 10% of waste stream = **A** tons		Combined Parkwide Tonnage Estimate	Combined Parkwide Percentage Estimate
	%	x ___ tons	%	x ___ tons	%	x ___ tons		
Paper	74.8	**B**	22.0		32.5		**C**	
Plastic	6.6	**B**	8.0		7.0		**C**	
Glass	2.4	**B**	13.0		4.4		**C**	
Metals	2.3	**B**	8.0		2.7		**C**	
Organics	13.5	**B**	30.0		52.9		**C**	
Other	0.4	**B**	19.0		0.5		**C**	

GO TO TOOLBOX 2 COMPOSITION

Note: this example shows only broad categories; depending on your waste stream, you may want to break down materials into subcategories of paper, plastics, metals, and organics. The reproducible worksheet in **Toolbox 2** provides these subcategories. An example of a completed waste composition estimate appears below.

	NPS Admin Offices 20% of waste stream = 200 tons		Campground 70% of waste stream = 700 tons		Snack Bar 10% of waste stream = 100 tons		Combined Parkwide Tonnage Estimate	Combined Parkwide Percentage Estimate
	%	x ___ tons	%	x ___ tons	%	x ___ tons		
Paper	74.8	149.0	22.0	154.0	32.5	32.5	336	33.6
Plastic	6.6	13.2	8.0	56.0	7.0	7.0	76	7.6
Glass	2.4	4.8	13.0	91.0	4.4	4.4	100	10.0
Metals	2.3	4.6	8.0	56.0	2.7	2.7	63	6.3
Organics	13.5	27.0	30.0	210.0	52.9	52.9	290	29.0
Other	0.4	0.8	19.0	133.0	0.5	0.5	134	13.4

TOOLBOX 2

GO TO COMPO-SITION

Note: this example ıows only ·o· :ateg ies; depending on your aste stre may want to break you ; into subcategories of metals, and organic The wo ıeet in **Toolbox 2** pro hes ategorie

TOOLBOX 5

O TO FLOPPY DISK

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n **Toolbox 5, Floppy Disk**

CALCULATE A DIVERSION RATE

Calculating a diversion rate for your park will identify your success at diversion, help you establish goals for new solid waste management programs, and let you track progress toward your goals.

TERMS

Waste diversion turns some of the solid waste into useful products through recycling or composting, thus diverting it from the landfill.

Diversion rate is the percentage of solid waste generated that is diverted.

TOOL FOR CALCULATING DIVERSION RATE

$$\text{DIVERSION RATE} = \frac{\text{TONS RECYCLED} + \text{TONS COMPOSTED} + \text{OTHER TONS DIVERTED}}{\text{TONS GENERATED}}$$

or

$$\text{DIVERSION RATE} = \frac{\text{TONS RECYCLED} + \text{TONS COMPOSTED} + \text{OTHER TONS DIVERTED}}{\text{TONS DISPOSED OF} + \text{ALL TONS DIVERTED}}$$

EXAMPLE

A park that landfills 1,000 tons of waste per year operates:

- an aluminum recycling program that collects 20 tons per year
- a campground container recycling program that collects 100 tons per year
- and a paper recycling program that collects 100 tons per year

The snack bar concessionaire also operates a cardboard recycling program that collects 100 tons per year, and the park's maintenance operation estimates that it collects 180 tons per year of tree limbs and wood waste, which it chips for use on hiking paths.

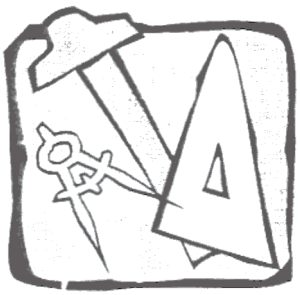
Calculate the total waste materials generated in the park and the diversion rate for the park, including the concessionaire's materials:

$$\frac{(20 + 100 + 100 + 100 + 180)}{1000 + (20 + 100 + 100 + 100 + 180)} = \frac{500}{1500} = 0.33 = 33\%$$

LOOK IN HAND BOOK

Other Tools

The ISWAP Waste Diversion Worksheet in **Appendix C** of the *NPS Handbook* is another useful tool for computing your diversion rates. The worksheet also includes a list of materials to *exclude* from your calculations.



STEP 2: DESIGN

Now that you have identified solid waste management costs, waste quantities, composition, current diversion, and your current solid waste programs (in **Step 1: Survey**), you can build on this information to design an improved solid waste management program, target the largest generators and the most common materials for effective options for diversion programs, and establish realistic goals for solid waste diversion and reduction. Your design tools include **establishing program goals; performing the who, what and where analysis; evaluating options; identifying resources needed to achieve goals; developing a schedule; and preparing an ISWAP document.**

DESIGN TOOLS

ESTABLISHING PROGRAM GOALS

The three NPS goals (ISWAP planning, 5% reduction, 40% recycled/composted) can be used as guides for establishing specific goals for your park. Establishing goals will help you design programs and measure their progress. Your goals may be to implement specific programs, to complete closure of landfill sites, to increase diversion and lower costs, or any combination of these. What is achievable in your park will be affected by your location, park services, type of waste stream, and availability of markets for the recyclables, and other services. You should consider these factors as you select your goals.

Example goals are:

- add procurement and education programs to the park to improve source reduction, reaching a 5% source reduction goal by 2002.
- add recycling programs for campgrounds, park offices, and lodge areas to recover paper, cardboard, aluminum, and steel cans. The goal may be to recycle an additional 10% through these programs by 2002.

  add composting programs for organic wastes including yard waste, food waste, waste paper, etc. to divert an additional percentage by 2002 while producing a useful product for park landscaping and revegetation projects.
- add visitor education programs to increase awareness of recycling and source reduction efforts. The goal is to have recycling messages in all visitor information areas (park newsletter, Internet web site, campground and visitor area signs and park ranger informative talks) by 2000.

Evaluating Options: Who, What, and Where Analysis

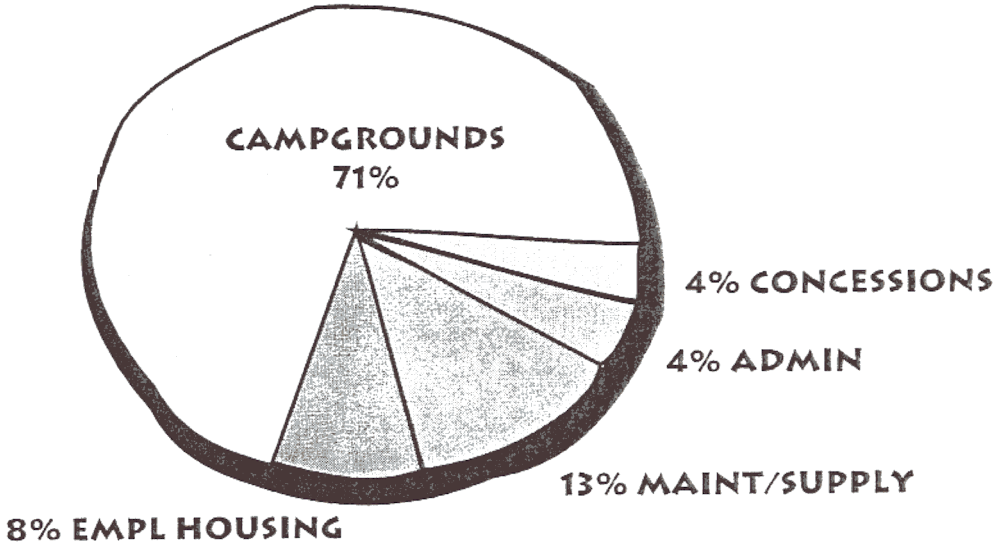
For designing new diversion programs, such as recycling and composting programs, as well as waste reduction programs, it is helpful to know where the greatest benefit can be achieved. The quantity and composition estimates you prepared in **Step 1: Survey** can be combined to answer the questions:

- **who** are the major solid waste generators in the park? (campgrounds, lodging, restaurants, park offices?)
- **what** are the most common materials in the solid waste from these generators? (paper, metals, food waste, cardboard?)

With this information, you can target the largest generators and the most common materials for effective diversion and source reduction programs, and answer the third question:

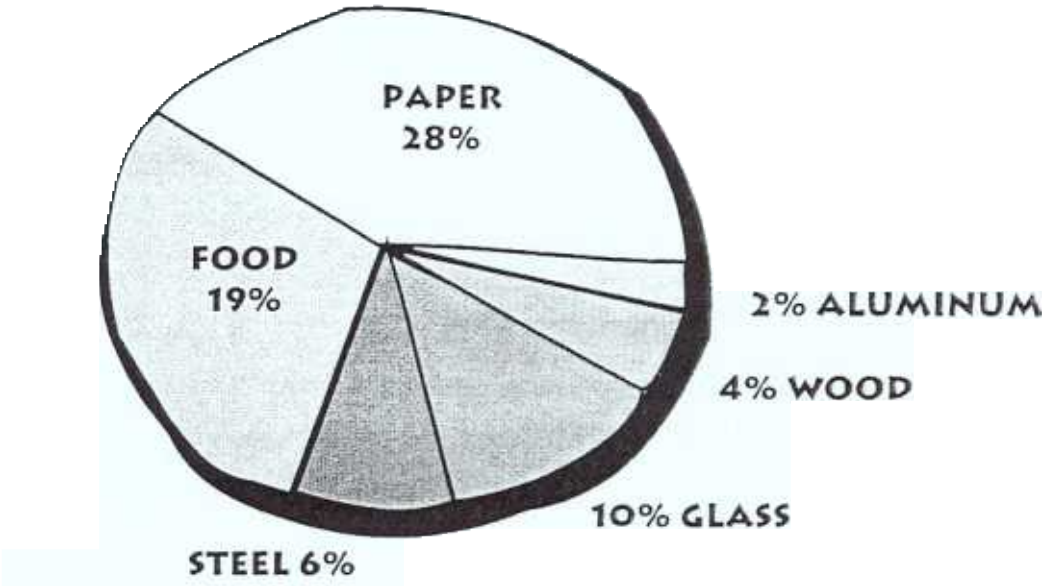
- **where** in the park should diversion programs be established? (recycling containers from campgrounds, composting food waste from restaurant operations, recycling paper and cardboard from park offices?)

EXAMPLE



Rocky Mountain National Park used their waste quantity analysis to show that 71 percent of all solid waste generated in the park was generated in the campgrounds. This answers the **who** question.

The waste composition analysis showed that the two largest materials in the waste stream were paper and food waste, followed by glass.



This answers the **what** question

By combining the who and what, the park estimated that:

92% of all food waste is generated in the campgrounds;

56% of all paper is generated in the campgrounds;

- 93% of all glass is generated in the campgrounds.

This is the answer to the **where** question. The park can get the most diversion with the fewest programs by designing diversion programs to address these three largest materials types in campgrounds, the largest solid waste generator in the park.

Evaluating Options: Program Design

Now you are ready to select and design specific programs for your park. You will most likely want to improve or create programs for purchasing recycled content products, for education of staff and visitors, for source reduction as well as for diversion programs, such as recycling or composting. You will most likely also want to look for ways to reduce solid waste collection costs, or to improve the efficiency of solid waste collection and disposal operations.

The following descriptions will provide some help in designing each of these program types. Examine the options below to select program types, identify costs, equipment, and staffing requirements. Then compare the options' effectiveness in reaching goals within your overall cost and resource requirements. Select the best for use in your plan.

- Before you implement any collection, disposal, recycling, or composting program, be sure you comply with all applicable state and local requirements and obtain all necessary permits and licenses. In some areas, all types of waste management

facilities, even those dealing with "clean" materials, are subject to siting and environmental restrictions.

Don't overlook opportunities to join forces with concessionaires and nearby communities in combined collection, recycling/composting/source reduction, and reuse efforts. Some programs, for example recycling, may become more economical with larger volumes of materials. Or waste exchange programs with local agencies may or private firms are a good way to acquire or dispose of materials. Also, the federal government may be a good source of used equipment (see pages 9).

DESIGNING PROCUREMENT PROGRAMS

Procurement is an essential part of an effective ISWAP. Purchasing recycled-content products conserves natural resources; buying in bulk where appropriate helps to reduce packaging waste; effective inventory control helps reduce waste of products.

The key personnel in the procurement chain are the Administrative Officer or others who have direct authority to authorize a purchase. Also, individuals purchasing supplies and materials on the spot with a government credit card should receive appropriate training to buy recycled. Be sure to identify and keep these people up to speed on the applicable regulations and product preferences.

A formal procurement plan will steer purchasing decisions to products and services that support your solid waste management objectives.

Your procurement program should:

- Educate every employee who makes purchasing requests and decisions to always ask if there are source-reduced, reused, recycled-content, or nonhazardous alternatives.
- Provide product information on source-reduced, reused, recycled-content, and nonhazardous alternative products for every park service employee who makes purchasing decisions.
- Include inventory control to limit waste of materials.
- Incorporate EPA guidelines for purchasing selected types of products made with recycled content, including equipment and construction materials as well as supplies.

OTHER TOOLS AND RESOURCES

- GSA specifically notes which include recycled content in its Environmental Products Guide, and at GSA-Advantage (GSA on-line shopping mall, www.fss.gsa.gov.)
- Materials suppliers can often provide information on recycled-content products.

GO TO TOOLBOX 6 RESOURCES

- *Comprehensive Procurement Guidelines*, EPA Publication (see Toolbox 6, **Resources**).
- *Buy Recycled Training Manual, 5th ed.* Northeast Maryland Waste Disposal authority (410/974-7524)
- *NPS Solid Waste Management Handbook*, **Chapter XI: Affirmative Procurement**.

LOOK IN HAND CH XI BOOK

Designing Education Programs

Education—of park staff, concessionaires, and visitors alike—will be essential to the success of your ISWAP. Education can change behavior to reduce or eliminate costly maintenance, it can increase visitor participation in park waste reduction programs, and it can inform visitors about the park's efforts to conserve natural resources and reduce the amount of waste sent to landfills.

Your education options are almost limitless. For park staff, simple reminders at staff meetings, regular training sessions, memos, and frequent newsletters can introduce new information and reinforce old messages. If time and budget permit, consider appointing an education coordinator.

Newsletters and fliers are effective tools for educating concessionaires. Pointing out the benefits, such as reduced operating costs, will help assure concessionaires' continuing cooperation—not just their compliance.

One park has used promotional tools like coffee mugs, T-shirts with the NPS recycling symbol, and coloring books to spread the word about its program. These products, distributed to employees and visitors alike, have been very popular and extremely successful in promoting recycling and waste reduction in the park.

LOOK IN HAND CH X BOOK

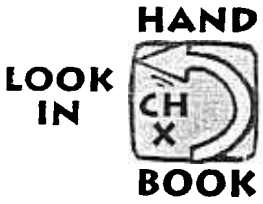
Park rangers can give special tours describing the park's solid waste management system and how it helps maintain the park's natural environment and wildlife. Rangers should stress the visitor's role in preserving the park's beauty by properly disposing of waste materials in appropriate receptacles while they are in the park. Well designed and placed signage can help reinforce the message and stimulate desired behavior.

Solid waste reduction messages can also be incorporated into park maps and tour guide talks. If you have a web site, explain your program briefly there and include links to other environmental sites dealing with solid waste.

Whatever form your education effort takes, remember the KISS principle: *Keep It Short & Simple*. Use pictures rather than words wherever possible, make it easy for visitors to participate by providing well-placed containers, and repeat the information frequently and consistently.

OTHER TOOLS AND RESOURCES

- Olympic National Park prepared a number of materials for public education, including an 8" x11" laminated campground sign for posting on exhibit boards, covering recycling and wildlife habitat, a children's activity guide distributed at concessionaire restaurants, called "Recycling Adventure", and a school curriculum guide called "Recycling for Wildlife and Habitat."



- EPA publications. See **Toolbox 6, Resources.**
- *NPS Solid Waste Management Handbook*, **Chapter X: Educating Visitors and Staff About the Park's Program**

SOURCE REDUCTION AND REUSE PROGRAMS

"Source reduction" means reducing the quantity or toxicity of solid waste at its source — your park. It includes the design, manufacture, purchase, or use of materials (such as products and packaging) to reduce the amount or toxicity of garbage generated. Source reduction can help reduce disposal and handling charges because it avoids the costs of recycling, municipal composting, landfilling, and combustion. Source reduction and reuse can be the most cost-effective forms of solid waste management, because materials that are reused or are never created don't become waste that must be managed. For that reason, source reduction and reuse have the same impact on your park's 5 percent waste-reduction goal.

Source reduction conserves resources and reduces pollution. Source reduction requires foresight and planning to keep materials out of the waste stream.

Reuse is a component of source reduction that involves using materials again in their original form. Office file folders can be saved and reused. Boxes, foam peanuts and other packaging materials can also be saved and reused.

Source Reduction Examples:

Solid waste generated by the park can also be reduced through effective procurement. Every Park Service employee and concessioner who makes purchasing decisions should have product information for reuse and reduced-packaging products.

Visitors should practice source reduction before they arrive at the park. Education for source reduction should target media and information that visitors can receive before leaving home. For example, you can encourage visitors to bring food and

beverages in coolers and insulated containers, rather than fast-food foam clamshells, bottles, and cups.

- Concessionaire restaurant operations can use refillable bulk dispensers for cleaners and other supplies. Condiments and other food products can be purchased in bulk to reduce single-serve packaging.

Reuse Examples:

- Old equipment, furniture, electronic goods can be donated to a charity for reuse rather than disposal.
- During a demolition project, many materials from old buildings can be salvaged and reused, saving a significant disposal cost.
- Concessionaire restaurant operations can use washable dishware, silverware and linens rather than disposable types. Condiments can be purchased in bulk and served in reusable containers.
- When you're in the market for equipment, the General Services Administration has Area Reutilization Specialists, staff members who search out, screen, and transfer property. Contact your local GSA representative to take advantage of their screening abilities.

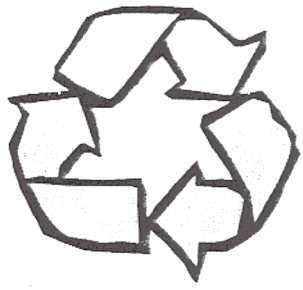
  The Property Exchange cc-mail bulletin board (NPS BB) has provided a great way for park areas to post excess property and for others in the service to benefit. Some park areas even have personnel whose duties are to screen excess property from a variety of sources and post items to the board. Keep viewing and utilizing this great resource conservation device.

- Also look into the DRMO (Defense Reutilization Marketing Organization). The Defense Department operates the DRMO system to dispose of surplus, unneeded, or used equipment and material. Inspection of the property is advised, as codes can be confusing. You may be able to contact a local park near the DRMO site to have them look at the item you want.

OTHER TOOLS AND RESOURCES

- Intermountain NPS contacts who've done it: The warehouse manager at Rocky Mountain National Park has developed a number of source reduction and reuse activities in the park warehouse, including reusing boxes and packing materials, donating old electronic equipment and computers to charities, and purchasing office supplies with recycled content.
- EPA publications (see **Toolbox 6, Resources**).
- *NPS Solid Waste Management Handbook*, **Chapter IV: Source Reduction and Reuse.**

Recycling Programs



Targeting materials for recycling is just the first step. Your recycling program design should include a design for collecting, transporting, processing, and marketing the recyclable materials.

Starting small and gradually expanding is a good approach for building a comprehensive recycling program. For instance, you might start with readily marketable, high-value materials like aluminum cans that are abundant in your waste stream. Once that program is in motion, you can add materials like plastic bottles and corrugated cardboard, which are more vulnerable to price fluctuations. Do your homework: check into available markets in your area and transportation costs to more distant ones.

Identifying markets or local processors to take the recyclable materials you collect is critical to the success of your program. For local processors, check the yellow pages of local communities under Recyclers and Trash Haulers. Local processors may be able to accept loose recyclable materials, then process and sell them to larger markets. Local haulers may offer recyclables collection and even processing services. Also check with your state solid waste program for staff and resources to locate markets and processors in your area. In the southwestern states of Arizona, New Mexico, Colorado and Nevada, the Southwest Public Recycling Association may be able to help locate markets and processors as well. See **Toolbox 8, Markets**, for more contacts and resources.

Concessions can be excellent locations for recycling programs. Commercial solid waste tends to be more uniform and higher in specific recyclable materials, such as cardboard, aluminum cans, steel cans, and glass. It is also often generated in one location or facility, making separation and collection of larger quantities of recyclables easier.

Other Tools and Resources

- Intermountain NPS contacts who've done it: Jim Erickson, Facility Manager, Big Bend National Park - Big Bend is constructing a transfer station for recyclable materials in the park. This will allow them to bale materials in the park, increasing their value, and replace inefficient local transportation with semi-trailer loads of recyclables which can be transported to larger markets. The project should increase the revenues from recyclable materials and reduce transportation costs.
- *Decision Makers Guide to Solid Waste Management*, EPA Publication No. 530-R-95-023. (See **Toolbox 6, Resources**).

COMPOSTING PROGRAMS

Composting can be an important component of your waste reduction plan, because it has the potential to divert large quantities of organic waste and yield a useful product at the same time. Your composting program design should include collecting, transporting, processing, and marketing compostable materials.

- Grass, leaves, and animal manure are the materials most commonly composted. They compost with a minimum of handling requirements and odor or animal vector problems, and they make a clean compost product.
- Food waste and soiled paper can also be composted, but they require additional processing, create harder to manage odor problems and may attract animal vectors. As foreign materials in the park, compost from these sources may not be suitable for in-park soil amendment uses.
- Processing food waste for hog feed is another option in some agricultural areas where feedlots operate.
- Woody wastes can also be chipped or shredded for use as mulch, trail cover, erosion control or compost amendment.

Co-composting municipal solid waste and sewage sludge also may be an alternative.

Before you begin any composting program, be sure you comply with all applicable state and local requirements and obtain all necessary permits and licenses.

EXAMPLE 1:

Yellowstone National Park began participating in a cooperative project to explore the possibility of composting wastes in 1995, with five Montana counties and two cities. The group developed initial program concepts and obtained funding for a feasibility study to explore the projects costs and benefits. In 1998 the group developed intergovernmental agreements to provide funding for further project development. The project would compost organic materials separated from solid waste, creating a compost product and saving costs compared to traditional collection and disposal of solid waste. The project is currently continuing development.

EXAMPLE 2:

At North Cascades National Park, a residential-sized enclosed composting drum is being used to compost all food waste from five households at a remote ranger station in the northern district of the park. The composting drum is powered by solar photovoltaic electricity, controls odors and can hold all the food waste the ranger station will

generate during a summer season. The composting project should reduce waste and hauling costs and eliminate odor problems in stored trash.

OTHER TOOLS AND RESOURCES

- Intermountain NPS contacts who've done it: Tim Hudson, Yellowstone National Park, has developed a large food waste composting program for park waste in cooperation with several area counties and municipalities.

LOOK IN HAND BOOK CH VI

- *NPS Solid Waste Management Handbook*, **Chapter VI: Composting.**

SOLID WASTE COLLECTION PROGRAMS

Collection will always be an essential part of the integrated solid waste management program and should be designed to support and complement the other programs. Because trash collection and disposal is probably the largest part of your solid waste management budget, improving the efficiency of this service can save significant money and staff resources that could be reapplied to new recycling or composting services.

- Waste collection sites offer a good opportunity to give visitors environmental information and to encourage them to participate in recycling, composting, and reduction programs.

  Replacing multiple cans with Dumpsters® or roll-offs can reduce collection costs and centralize recycling opportunities. But always try a pilot program before making a major cost commitment to new collection methods or containers.

- Removing cans from difficult to service locations and relocating them to more convenient areas can save significant collection time. Remote trailheads can be converted to "pack-it-in, pack-it-out" areas. Campgrounds can replace smaller cans located in campground loops with larger containers located at the entrance station or at restroom facilities.

- If the park provides solid waste collection services to concessionaires within the park, establish fees that encourage efficiency. Volume-based fees charge by the amount of waste disposed and create an incentive for the concessionaire to generate less trash. Provide service fee reductions for using automated collection containers such as Dumpsters® rather than smaller cans or bags. This will improve the park's overall collection efficiency and reduce manual handling of containers.

EXAMPLE

Bryce Canyon National Park removed all 30-gallon trash cans from their campground loops and replaced them with larger Dumpsters® located at the entrance to the campgrounds. With good public education and proper signage, they have not

experienced a litter problem and have significantly reduced collection costs, and eliminated manual lifting of trash cans — a common source of worker injury. Bryce estimates they have saved approximately $25,000 per year from their maintenance budget by making this improvement to their solid waste collection program.

OTHER TOOLS AND RESOURCES

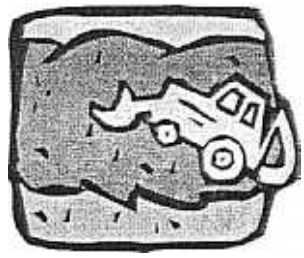
- Intermountain NPS contacts who've done it:
  - Michael Castagnetto, Facility Manager, Bryce Canyon National Park - Bryce Canyon replaced cans with Dumpsters® in campground loops without litter problems.

    Poly Barella, Safety Officer, Petrified Forest National Park - Petrified Forest evaluated the fill rate of solid waste containers throughout the park and is removing containers from underused areas, reducing collection costs.
  - Glenda Hammond, Maintenance Supervisor, Padre Island National Seashore - Padre Island removed solid waste containers from beach areas where they were difficult and expensive to collect, and moved them to fewer beach access areas, saving in collection costs and in beach cleanup costs.

HAND LOOK IN BOOK

- *NPS Solid Waste Management Handbook*, **Chapter VII: Trash Collection Practices.**

LANDFILL DISPOSAL



Landfilling will remain an essential part of the integrated solid waste management program. Landfilling costs should be arranged to allow for savings when the quantity of solid waste is reduced.

The ISWAP plan should consider the price, capacity, and regulatory changes that may affect disposal practices.

Alternative landfill disposal sites should be planned well in advance (at least five years) of needing them. Transfer stations could be a good alternative if local landfill capacity is limited or too costly.

OTHER TOOLS AND RESOURCES

Intermountain NPS contacts who've done it:

- Dan Bishop, Facility Manager, Glen Canyon National Recreation Area - Glen Canyon is investigating the development of a transfer station for solid waste. With the closure of the local landfill, transportation costs and disposal costs have increased significantly, making the transfer station alternative potentially more cost-effective.

HAND BOOK

- *NPS Solid Waste Management Handbook*, **Chapter VIII: Disposal Facilities.**

LOOK IN 

Resources Needed to Achieve Goals

For the options that you picked, be sure to account for all requirements to construct your plan:

- equipment
- staffing
- contractors
- product markets
- materials value
- transportation
- education
- funding resources

NPS Funding Information

The funding for projects comes from monies allocated through a centralized fund administered by the Park Facility Management Division, Hazardous and Solid Waste Program. Recently, the Intermountain Region decided to remove the Environmental Management program from SEPAS priority setting process. There will still be a process to ensure that there is adequate field review of all projects.

National program guidelines are now being revised for all funding types within the Hazardous and Solid Waste area. For the present, parks should submit solid waste projects under the general title: *Hazwaste/Waste Reduction and Storage*. Parks should continue to use the Project Management Information System (PMIS) for entering projects. Projects can be entered at this time during the fiscal year, but parks will be notified at least 60 days in advance of any "call" for hazardous and solid waste projects, so that they can prioritize their lists.

Solid waste priority funding criteria are under development. We suggest that parks contact the Intermountain Region, Denver Support Office, Environmental Management Program, for assistance. Parks should assume that planning and implementation projects, including infrastructure projects, would continue to be eligible for funding under the program. It should be noted that there will be increasing emphasis on *only* funding projects based on some analysis, particularly a park-approved Integrated Solid Waste Opportunity Assessment.

Construction Schedule

A schedule of when the steps and tasks required to construct your facilities, programs or new services is an important construction tool. The schedule will help to keep the project organized, make work assignments, order materials and equipment, develop contracts, and make budget requests.

- The schedule can be general or specific, but should include the task, the time frame the task must be performed, the responsible person or department, and resources required, such as budgets, equipment or other staffing.
- Set up your schedule to coincide with the park's calendar or fiscal year and recognize the timing of annual staffing assignments and budget requests.
- Describe all the tasks in your schedule in accountable terms, with a deliverable product, so that you and others can tell if the task was completed. For example, describe an education task as "place public education signs in each park building, rather than "expand public education."

The following table is an example schedule, showing one year's scheduled resources and tasks for an ISWAP plan.

Rocky Mountain National Park
Schedule of Resources - Baseline Year (1998)

Action	Cost	Personnel/ Equipment	Responsible Agency
Administrative and General Establish complete and accurate ISWAP baseline Revise/finalize performance tracking and reporting procedures Monitor and adjust as required Park's ISWAP Plan		No Addl. Equip. Total for All: 6 Person Days	Facil Maint Division Facility Manager Facil Maint Division
Solid Waste Management Implement reduction in roadside, remote area trash containers and replacement of cans with Dumpsters®		5 Person Days	Facil Maint Division
Reuse - Source Reduction Expand Park staff's and concessionaire's existing reuse and source reduction efforts		12 Person Days	Chief of Resource Management
Recycling Improve Campground recycling container identification and signage - include sidebar in Park newspaper	$500	4 Person Days	Facil Maint Division
Composting ▪ Develop composting program requirements if necessary			
Total	**$500**	**27 Person Days**	

PREPARE AN ISWAP DOCUMENT

Preparing a written ISWAP plan will document your work in planning and designing a new solid waste management program. A written plan will make your park meet the first NPS goal, and can be used to demonstrate your planning work when you request funding. The following is a suggested outline for an ISWAP plan:

Introduction: write a brief description of your park here, note the size, location, main features, facilities, size of staff and visitation

2. **Description of Current Solid Waste Management Practices**

   Waste Generation Estimate: insert your waste generation estimate from the Survey tools. Describe the method used to develop your estimates and show your calculations.

   - **Waste Diversion Estimate:** insert your waste diversion estimate from the Survey tools. Describe the method used to develop your estimates and show your calculations.

   Waste Composition Estimate: insert your waste composition estimate from the Survey tools. Describe the method used to develop your estimates and show your calculations.

3. **Potential Influences on the Solid Waste Program:** add a brief mention of your visitation levels – are they projected to increase? Other influences could be a nearby landfill closing, an increase in landfill fees, a change in concessionaire operations, or how much visitation increases in summer versus winter.

4. **Program Goals/GPRA Outcomes:** To comply with the requirements of the Government Performance and Results Act (1993), the NPS has developed a GPRA Strategic Plan. This Plan includes GPRA mission goals. Your park is developing an annual GPRA performance plan and tracking accomplishments to demonstrate compliance with the GPRA Strategic Plan. Your environmental management work, including solid waste, can be included in your park's GPRA performance plan under the GPRA mission goal "Provide for the Public Enjoyment and Visitor Experience of Parks". Your park's solid waste management "GPRA outcome" or long-term goal should include elements such as:

   Collection efficiency and resulting reduced costs

   Emphasis on source reduction activities

   Recycling and composting that can be sustained long-term

   Development of partnerships and sharing of resources

   - Visitor education that contributes to global sustainability

Parks can use their outcome statements to construct annual goals, develop baseline data, and track accomplishments. They will also be able to establish levels of effort and outside assistance needed to accomplish the goals. Contact Dr. Michael Schene, Environmental Program Manager, Intermountain Region, Denver Support Office, for further assistance in developing their GPRA goals.

5. **Evaluation of Options**: Briefly describe the new programs and program changes you would like to have to help reach your goals. Include the information you developed in Design tools, including the who, what and where analysis, and program options selected.

6. **Resources Needed to Achieve Goals/Outcomes**: this would be based on the programs suggested in the above section, and would be a listing of equipment, labor and other needs you would have to be able to implement the programs above. Some may cost money and be budget items, others may a free, cooperative effort.

7. **Implementation Schedule**: a brief description of when the new programs will start, what needs to be done before they can start. Use the Design tools for the construction schedule.

Other Tools and Resources

Contact Dr. Michael Schene, Environmental Program Manager, Intermountain Region, Denver Support Office, for further assistance in developing their GPRA goals.

NPS Resource Documents:

- NPS *Solid Waste Handbook*
- NPS *Hazardous Waste Management Handbook*
- NPS *Pollution Prevention and Community Right-to-Know Training Manual*
- NPS *Environmental Compliance Information System* (ECIS)
- *Envirofacts* (to be released)
- *Buy Recycled Training Manual, 5th ed.* Northeast Maryland Waste Disposal authority (410/974-7524)

Other NPS ISWAPs: Rocky Mountain National Park, Bryce Canyon National Park, Glen Canyon National Recreation Area

STEP 3: CONSTRUCTION

How to Build Your Programs

By now, you have designed your programs. Now they are ready to be built and put in place. Building a program will involve getting the resources you need—vehicles, containers, staff, even signs or posters—assembling them in the right place at the right time, and getting them up and running. Your construction tools may include **new work assignments for park staff, new equipment and supplies, new contractor services and new concessionaire programs and services.**

CONSTRUCTION TOOLS

The Construction Crew: Work Assignments for Park Staff

Put larger assignments in writing, make them part of the job description, and include assignment-specific goals such as:

- purchase 10 recycling containers of a size and design in accordance with the park's ISWAP recommendations.
- have containers selected, purchased, delivered and installed at all park recycling locations by June 1, 1998 for the start of recyclables collections.
- coordinate with the staff person in charge of purchasing the collection vehicle to ensure the containers are compatible with the collection vehicle.

Include park administration in design and construction to get support for staff assignments. To supplement staff, consider using interns, park volunteers, or community service organizations for some specific assignments.

Construction Materials: Purchasing Equipment and Supplies

NPS funding opportunities and procedures for equipment and supplies include the annual budget cycle, end-of-year monies, benefits of ISWAP for funding, and special equipment funding for solid waste management.

Always buy products with recycled content if possible. Look for the highest post-consumer content when doing so.

- Before committing to the purchase of any equipment, conduct a life-cycle cost analysis of the costs of a product, including capital, installation, operation,

maintenance, and disposal, amortized over the item's useful life. This important planning step helps assure adequate funding for purchase and upkeep throughout the item's useful life. You should also consider its lifetime environmental impacts, including raw material extraction, transportation, manufacturing, use, and disposal.

- Before you implement any collection, disposal, recycling, or composting program, be sure you comply with all applicable state and local requirements and obtain all necessary permits and licenses. In some areas, all types of waste management facilities, even those dealing with "clean" materials, are subject to siting and environmental restrictions.

- Research thoroughly the specifications for equipment. For larger equipment purchases, such as a chipper, collection vehicle, or baler, test the equipment before purchasing. Also contact others who use the equipment to discuss its operation and effectiveness. Place your order early enough for your order to be filled and transported to the park, so it will be available when you need it.

  Consider cooperative purchasing of major equipment items with another park or other partner. You may be able to save a major portion of the equipment cost and still have adequate use of the equipment for your program.

TOOLBOX 7
GO TO

CONTRACTS

CONTRACTING FOR SERVICES

Contact your park's Purchasing Officer for specific contracting requirements. For most service contracts, such as a contract for preparation of an ISWAP plan, the contract must be put out to competitive bid if over $2,500 in value. A bond requirement may apply if the contract value is over $25,000. An example statement of work for a service contract to prepare an ISWAP plan is provided in **Toolbox 7, Contracts**.

WORKING WITH CONCESSIONAIRES

Focus on win/win approaches. Most concessionaire operations, such as lodging, restaurants, and retail stores, generate solid waste typical for such commercial businesses, which is more uniform and contains more recyclable or compostable materials than residential or visitor-generated solid waste. Recycling and composting programs for these materials are often more cost-effective and may save the concessionaire operations money over their current landfilling costs. Focusing on these programs for concessionaire participation can provide a financial incentive for the concessionaire to participate.

But be sure to back those incentives with formal policy. Contracts can be written to specify waste prevention goals or requirements, and you can also contractually require concessionaires to measure and report quantities of materials generated and recycled.

OTHER TOOLS AND RESOURCES

- Intermountain NPS contacts who've done it: Micheal Castagnetto, Facility Manager, Bryce Canyon - Bryce developed a recycling program for cardboard and other materials that allows the lodge and restaurant concessionaire to participate, saving the concessionaire disposal costs and significantly increasing the park's overall diversion rate.

- *NPS Solid Waste Management Handbook*, **Chapter IV: Source Reduction and Reuse**, page 6 contains an example of concessionaire solid waste requirements.

STEP 4: MAINTENANCE

How to Keep your Programs in Peak Condition

You have designed and built your integrated solid waste management system, and the programs are operating. Now, as time passes, you need to re-evaluate them to see if they can be improved or adjusted to accommodate changes in the park. You also need to check the performance of your programs, and document progress towards your park's regional goals and GPRA Outcomes. Your maintenance tools include **tracking diversion, tracking costs, and improving efficiency and services.**

MAINTENANCE TOOLS

Tracking Diversion Tool

Every year, recalculate your diversion rate. The tools described in the Survey section for calculating a diversion rate can be used each year to track your progress towards your diversion goals. If diversion is not increasing, you need to re-evaluate your programs and make improvements, such as increasing education and promotion, or expanding the number of locations for recycling. You can also repeat the baseline quantity and composition estimates to determine whether your solid waste reduction goals are being met, and if programs need to be added or changed to divert materials which are still being landfilled .

Tracking Costs Tool

Every year, monitor all costs of all programs in the integrated solid waste alternatives program. Set up a tracking system to determine whether costs are within budgets and whether your anticipated cost savings are being realized. Are the programs effective? How can you change the programs to reduce costs?

Improving Efficiency and Services Tool

GO TO P 25

Every year, repeat the "who, what, and where" questions: are the programs doing what they were designed to do? If they are not, the "who, what, and where" check should indicate where you need to make adjustments to increase diversion. Are some parts of the solid waste stream being handled ineffectively? How can you change that? Can you add new programs to encourage better visitor participation?

Establish an annual evaluation of the program in coordination with the park's annual budget cycle to review diversion rates, costs and the quality of services. Schedule administrative review of annual results, with the opportunity to propose changes and budget for them in the upcoming fiscal year.

CONCLUSION

By working through this Tool Kit and following the sequence of steps of Survey, Design, Construction, and Maintenance, you should be able to accomplish several important steps. You should be able to develop your solid waste management program with changes and improvements in education, procurement, collection, reduction, recycling, and composting. You should be able to document the steps you went through to develop your program and satisfy the regional solid waste goal # 1 and meet GPRA reporting requirements. And you should be able to continue to track solid waste management in your park and monitor and maintain your solid waste management programs and facilities in the future.

TOOLBOXES

TOOLBOX 1

Annual Volume per Container Method: Route Sheet

TOOLBOX 2

Combined Waste Composition Estimate Work Sheet

AVERAGE VOLUME PER CONTAINER METHOD

Route Sheet

Route Name _____ Date _____

Container Location	Container Type, Size (CY)	Number of Containers at This Location	Estimated Percent Full	Total for Location*

Total Cubic Yards Collected

For each row, multiply size (cu.yd.) X number of containers X percent full (decimal form, 0.00) = Total Estimated Cubic Yards Collected.

COMBINED WASTE COMPOSITION WORKSHEET

A Fill in the percentage for each material. Use standard composition or modified based on park-specific information

B Estimate the percentage of total waste for each generator.

C Calculate in tons the fraction of the total waste stream created by each generator.

	NPS Admin Offices B% of waste stream = C tons		*Campground* B% of waste stream = C tons		*Snack Bar* B% of waste stream = C tons		*Concessionaires* B% of waste stream = C tons		*Others* B% of waste stream = C tons		Combined Parkwide Tonnage Estimate	Combined Parkwide Percentage Estimate
	%	x ___ tons	%	x ___ tons	%	x ___ tons	%	x ___ tons	%	x ___ tons		
Paper												
Cardboard	A	D									E	
News	A	D									E	
Office	A	D									E	
Mixed	A	D									E	
Plastic												
PET	A	D									E	
HDPE	A	D									E	
Film	A	D									E	
Polystyrene	A	D									E	
Other	A	D									E	

	NPS Admin Offices B% of waste stream = C tons		Campground B% of waste stream = C tons		Snack Bar B% of waste stream = C tons		Concessionaires B% of waste stream = C tons		Others B% of waste stream = C tons		Combined Parkwide Tonnage Estimate	Combined Parkwide Percentage Estimate
	%	x ___ tons	%	x ___ tons	%	x ___ tons	%	x ___ tons	%	x ___ tons		
Glass												
Containers	A	D									E	
Other	A	D									E	
Metals												
Ferrous	A	D									E	
UBC	A	D									E	
Other aluminum	A	D									E	
Other metals	A	D									E	
Organics												
Yard	A	D									E	
Food	A	D									E	
Wood	A	D									E	
Other org.	A	D									E	
Other	A	D									E	

STANDARD WASTE COMPOSITION DATA

Material	Yosemite (campground)	Yosemite (Housing Areas)	Yellowstone (All Areas)	Jasper (Canada) (Campgrounds)
Paper	**22%**	**26%**	**29%**	**23.3%**
Mixed	14%	17%	7.2%	14.6%
Newspaper	2%	2%	4.1%	n/a
Corrugated	6%	7%	16.1%	7.7%
Other	n/a	n/a	1.7%	n/a
Plastic	**8%**	**7%**	**6.6%**	**7.2%**
PET	<1%	<1%	0.2%	7.2%
LDPE	2%	1%	n/a	n/a
HDPE	1%	1%	0.6%	n/a
Other	5%	5%	5.8%	— n/a
Metal	**8%**	**4%**	**5.2%**	**6.6%**
Ferrous	5%	4%	1.9%	4.1%
Aluminum	3%	<1%	1.8%	2.5%
Misc.	n/a	n/a	1.5%	n/a
Other inorganics	13%	2%	n/a	Ash 28%
Glass	13%	7%	8.7%	12.4%
Wood	<1%	12%	n/a	n/a
Food waste	25%	11%	36.9%	11.9%
Other organics	4%	13%	n/a	4.2%
Yard waste	<1%	7%	n/a	6.7%
Misc.	6%	10%	13.5%	<1%

TOOLBOX 3

ISWAP Tracking Worksheet

ISWAP TRACKING WORKSHEET

Park_____ Completed by_____ Phone _____

Item/Task/Goal	1998	1999	2000	2001	2002	Notes
1 Visits (# visitors/year)						
2 Estimated Waste Reduction (tons)						
3 Estimated Waste Generated (tons)						should equal sum of lines 4 and 5
4 Estimated Waste Diverted (tons)						total of recycling, composting
5 Estimated Waste Disposed (tons)						
6 Current Diversion Rate (%)						line 4 divided by line 3
7 Current Generation Rate (pounds/visitor)						line 3 times 2000, divided by line 1
Goals (include brief description in notes)						
Planned Program Changes (include brief description in notes)						

TOOLBOX 4

Dumpster Diving Guide

Dumpster Diving Guide

A field sort involves physically separating solid waste into different materials categories. Because of the possibility of encountering hazardous materials in solid waste, consult with your park safety office and Hazardous Materials Coordinator for safety procedures before conducting the field sort.

Equipment you'll need

1. safety glasses, gloves, protective clothing, knife, poker, tongs, or large pliers.
3. weighing scale, either hanging type or platform type, accurate to ounce or 0.10 pounds.
4. containers for sorted materials - kitchen-size plastic bags work with hanging scales, plastic trash cans, 5-gallon buckets or laundry baskets work with platform scales.

The basic steps to conducting a field sort are:

A. Determine the location and number of samples to sort. Pick all samples from the same location if you want to determine the composition of one operation, such as campground waste. Pick samples from a variety of locations if you want to determine an average, or overall composition. You should be able to sort several from each location to get reasonable accuracy. Each sample should be as large as possible, ideally over 50 pounds each. Be sure to take the samples during the busy season for that location, to get a representative sample of what the majority of trash will be like.

B. With proper safety and weighing equipment, select a sample, empty the container, open bags and spread out the contents, sort them by material category and weight each sorted material. Use the knife, pliers and poker to open bags and spread out materials. If uncertain as to which category something falls into, you can put it under "Other," but be consistent with all samples.

C. Record the weight data and prepare an analysis of the totals, averages and individual materials category percentages, and any other statistics of interest.

Dumpster Diving Health and Safety Plan

Purpose

The purpose of this Dumpster Diving Health and Safety Plan is to ensure a safe working environment. This plan describes minimum safe work practices, personal protective equipment, and training that must be implemented during Dumpster diving activities.

SAFE WORK PRACTICES

Confined Spaces

Regular Dumpsters used for park waste disposal are considered confined spaces. A confined space as defined by OSHA contains the following characteristics:

a) Any space that is large enough for an employee to enter and perform work.

b) Any space that has limited or restricted means for entry or exit

c) Any space that is not designed for continuous employee occupancy

Since park procedures require hazardous materials and wastes to be properly stored before disposal, these materials should not be found in park Dumpsters. Therefore, park Dumpsters should not contain hazardous atmospheres. In addition, park Dumpsters should not contain other hazards which could cause death or serious physical harm. Since park Dumpsters do not contain hazardous atmospheres and conditions which can cause death or serious physical harm, the National Park Service has classified park Dumpsters as Non-Permit Confined Spaces.

If Dumpsters containing hazardous materials or waste are found on park site, these Dumpsters must not be entered by park employees. They are classified as Permit Required Confined Spaces and must comply with the regulations specified in 29 CFR 1910.146.

HAZARDOUS ENERGY SOURCES

If park employees must enter Dumpsters with a built in trash compactor, shredders or other sources of hazardous energy, the Park Safety Officer must be contacted and OSHA lock out / tag out procedures must be implemented in accordance with 29 CFR 1910.147 before entry.

DUMPSTER DIVING SAFE WORK PRACTICES

A. Park employees, contractors or volunteers must not enter a Dumpster unless there is at least one attendant outside the Dumpster when the entry is made.

B Before entry begins, the entrant and the attendant must visually inspect and the Dumpster and note any potential physical hazards.

C If leaking containers of hazardous materials are sighted during the pre-entry inspection, the Park Safety Officer must be immediately contacted. Entry cannot be made until the material is identified and additional work practices and/or personal protective equipment are utilized.

D If the entrant or attendant notices the presence of hazardous chemicals in the Dumpster, the entrant must immediately evacuate and contact Park Safety Officer. Possible signs indicating the presence of hazardous

chemicals include unusual smells such as that of solvents, corrosion, a change in temperature, unusual sounds such as that of a leaking gas canister.

E. To the extent feasible, provision shall be made to ensure ready entry and exit by preventing obstruction of the opening or passageway during the work procedures.

F. If ladders are utilize to enter Dumpsters, they must have safety feet and be free from sharp edges and splinters.

G. All Dumpsters must be located outside to ensure proper ventilation during entry.

H. During the actual Dumpster diving procedure, the entrant must be in voice contact with the attendant at all times. If the entrant shows any signs of chemical exposure such as rash, eye irritation, dizziness, giddiness, nausea or tiredness, the attendant will immediately order the entrant to evacuate the Dumpster. The Park Safety Officer must immediately be contacted for further instructions.

No smoking or open flames of any kind are allowed within 100 feet of a park Dumpster during Dumpster diving activities.

J. Dumpster diving activities may not take place during thunderstorms or when lightning is seen.

K. During Dumpster diving activities, the Dumpster must be properly illuminated.

PERSONAL PROTECTIVE EQUIPMENT

During Dumpster diving activities, all entrants must be equipped with the following:

A. Long pants and a long sleeve shirt and/or Tyvek® suit.

B. Leather work gloves.

C. Work Boots or steel toed boots.

D. Safety glasses.

Respirators must not be used unless specified by the Park Safety Officer. If respirators are used, all entrants must have a proper pulmonary function test, medical evaluation, and respirator fit test prior to wearing the respirator for Dumpster diving activities. In addition, all OSHA respirator regulations must be followed in accordance with 29 CFR 1910.134.

If hazardous chemicals are found in the Dumpster, entrants must immediately evacuate and the Park Safety Officer must be immediately contacted. Depending upon the chemicals found, additional personal protective equipment such as respirators and chemical protective clothing might be needed.

TRAINING

All employees performing Dumpster diving activities must receive training on the following:

A Identification of potential physical and chemical hazards which may be found in Dumpsters. These include but are not limited to: Sharp objects, flammable materials, and hazardous materials which were improperly disposed of.

B Identification of possible signs of chemical exposure. These include but are not limited to: rash, eye irritation, dizziness, giddiness, nausea, or tiredness.

C Information on the safety use of ladders

D Information on proper means of egress into and out of the Dumpster

E. Information on the proper use of personal protective equipment.

Training records should be kept in the file of each employee performing Dumpster diving activities.

ADDITIONAL INFORMATION

For additional on health and safety issues related to Dumpster diving activities please contact Mike Schene, Environmental Protection Officer, Intermountain Region - Denver Support Office at (303) 969-2877.

OTHER TOOLS AND RESOURCES

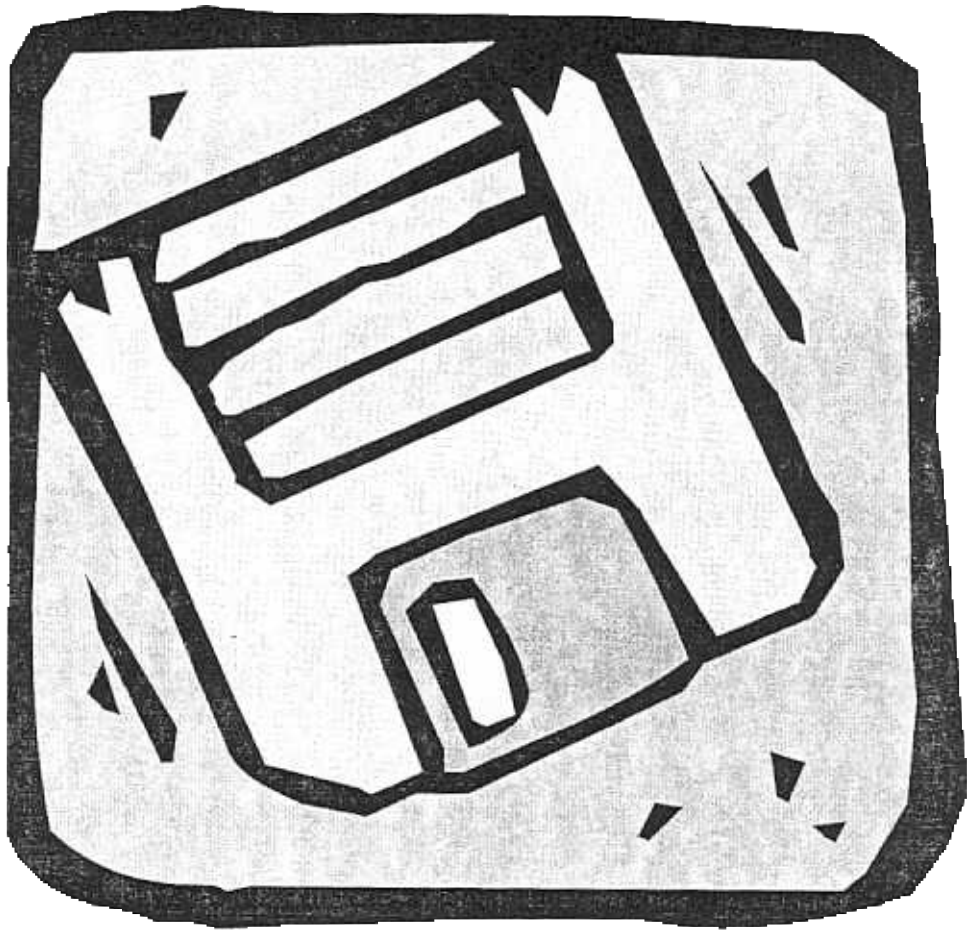
The *EPA Business Guide for Reducing Solid Waste* contains a detailed description of a field sampling and estimating procedure. Call the RCRA hotline at (800) 424-9346 and ask for document 530-K-92-004. You'll find more useful information about waste composition in **Chapter III** of the *NPS Solid Waste Handbook*. Also see **Toolbox 6, Resources**.

WASTE COMPOSITION - DATA COLLECTION AND CALCULATION SHEET

MATERIALS	Sample 1		Sample 2		Sample 3		Average - All	
	Wt (Lb)	%	Wt (Lb)	%	Wt (Lb)	%	Wt (Lb)	%
PAPER								
Corrugated Cardboard (OCC)								
Newspaper (ONP)								
Office Paper (OP)								
Mixed Paper (MP)								
Other								
PLASTIC								
PET								
HDPE								
Film								
Polystyrene (PS)								
Other								
GLASS								
Containers								
Other								
METALS								
Ferrous								
Aluminum								
Used Beverage Container (UBC)								
Other								
Other								
ORGANICS								
Yard Waste (YW)								
Food Waste (FW)								
Wood Waste (WW)								
Other								
OTHER WASTES								
TOTAL								
NOTES:	1 -							
(Location, date and details of sorts)	2 -							
(Model calculates average of all	3 -							
samples from one to all six.)	4 -							
	5 -							
	6 -							

TOO BOX 5

Floppy Disk



FLOPPY DISK

You can photocopy the worksheets from Toolboxes 2, 3, or 4 or you can print them from the enclosed floppy disk, which contains these worksheets:

Toolbox 2	*Combined Waste Composition Worksheet*
Toolbox 3	*ISWAP Tracking Worksheet*
Toolbox 4	*Waste Composition Data Collection & Calculation Worksheet*

The worksheets are combined in single files in three formats:

forms.wpd	**WordPerfect 6/7/8 format**
forms.doc	**Word 6 format**
forms.pdf	**PDF format (needs Adobe Acrobat reader)**

The WordPerfect and Word files can be edited if you need to customize the forms for your park.

The PDF file can only be printed, and you will need the Adobe Acrobat Reader (2.1 or higher) to view and print the forms. If you don't have Acrobat already, go to the Adobe Web site (**www.adobe.com**) and click the "Download Acrobat" button at the lower left corner of your screen. The file is about 4.7 MB, and it's free.

TOOLBOX 6

Resources

EPA/NPS Publications

- Municipal Solid Waste Publications, 1997
- *Decision Makers Guide to Solid Waste Management*, EPA Publication No. 530-R-95-023
- NPS *Solid Waste Management Handbook*, 1996
- NPS *Hazardous Waste Management Handbook*
- NPS *Pollution Prevention and Community Right-to-Know Training Manual*
- *Executive Order 13101, September 14, 1998, Greening the Government through Waste Prevention, Recycling, and Federal Acquisition.*

EPA Telephone Resources

- RCRA Hotline 800-424-9346

Advisors and Mentors

For questions about the Intermountain Region ISWAP program and related issues, contact:

NPS Intermountain Region Solid and Hazardous Waste Program Manager
Michael Schene
National Park Service
PO Box 25287-PM
12795 West Alameda Parkway
Lakewood, Colorado 80225
Phone: (303) 969-2877
Fax: (303)969-2063
Email: mike_schene@nps.gov

For questions about EPA and pollution prevention, contact:

EPA Region 8 Pollution Prevention Project Manager
Suzanne Stevenson
Environmental Protection Agency
8P-P3T
999 18th Street, Suite 500
Denver, Colorado 80202-2466
Phone: (303) 312-6122
Fax: (303) 312-6044
Email: stevenson.suzanne@.epa.gov

For questions about the National Park Service ISWAP and environmental programs, contact:

Your NPS WASO Program Manager
Shawn Norton
National Park Service
(MS-7253)
1849 C Street NW
Washington, DC 20240
Phone: (202) 565-1244
Fax: (202) 565-1266 fax
Email: shawn_norton@nps.gov

For how-to information from facility managers who've already built their own ISWAPs, contact:

NPS Pilot Program Participants
John Gibson/Glenda Hammond
Facility Manager/Maintenance Supervisor
Padre Island National Seashore, 9405 S.P.I.D
Corpus Christi, TX 78418
Phone: (512) 949-8173 x240
Email: john_gibson@nps.gov

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11500 Highway 50
Mosca, CO 81146
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Email: mark_seaton@nps.gov

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P.O. Box 129
Big Bend National Park, TX 79834
Phone: (915) 477-1114 x114
Email: jim_erickson@nps.gov

Bill Gowett
Facility Manager
Grand Teton National Park
P.O. Drawer 170
c/o Moose Warehouse
Moose, WY 83012
Phone: (307) 739-3347
Email: bill_gowett@nps.gov

Other Resources

The Internet: Countless sites devoted to environmental issues. Here are a few launching pads for finding solid waste information on the Web. Start with the NPS site, which contains a wealth of information, documents, and links to help you develop and manage a sustainable ISWAP

- **ParkNet**, NPS home page. http://www.nps.gov/
  Green Toolbox — Documents and links on energy and sustainability regulations, renewable energy, energy conservation, water conservation, alternative transportation fuels, building materials, office supplies, reuse, source reduction, recycling, much more.
  http://www.nps.gov/toolbox/;
  Sustainability case studies http://www.nps.gov/renew/case/
  NPS Facility Web Site http://www.nps.gov/facilities/
  The National Park Service Guide to Providing Appropriate Facilities
  http://www.nps.gov/dsc/dsgncnstr/toolbox.html
- **DRMO (Defense Reutilization Marketing Organization)**. Possible source of equipment for reuse, this Web site lists materials available by category and has a search function
  http://www.drms.dla.mil
- **Waste exchange links** http://www.enviroworld.com/Resources/matexchs.html
- **EnviroTech On Line** The largest catalog of environmental sites on the World Wide Web!
  http://www.envirotech.org/
- GreenLink, the environmental starting point. http://www.nwlink.com/~van/greenlnk.html
- **Amazing Environmental Organization Web Directory**. Bills itself as "Earth's biggest environmental search engine." http://www.webdirectory.com/Recycling/

FedWorld, the jumping-off place for federal information resources. http://www.fedworld.gov/

Department of Energy. DOE's home page. http://198.124.130.244/

- **Environmental Protection Agency**. EPA's home page. http://www.epa.gov/;
  Solid Waste Info. http://www.epa.gov/epaoswer/non-hw

National Technical Information Service Services for Federal Agencies to help you organize and keep track of your scientific, technical, engineering, and business related information and

reach U.S. business and industry leaders as well as the public at large.
http://www.ntis.gov/ntisserv.htm

United States Environmental Protection Agency | Solid Waste and Emergency Response (5305W) | EPA530-B-98-003 Summer 1998 www.epa.gov

EPA

Office of Solid Waste Publications

Copies of the following publications can be obtained for no charge by:

- Calling the EPA RCRA/UST, Superfund, and EPCRA Hotline at 800 424-9346 or 703 412-9810 in the Washington, DC, metropolitan area. You will need to provide the document number for the publication(s) you wish to order.
- Mailing in this flyer with the publication(s) you wish to order. Simply write the number of copies requested on the line next to the publication.

All publications marked by an asterisk are available on the OSW Publications CD-ROM. See back panel for ordering information.

COMBUSTION/INCINERATION

530/SW-90-029b
Characterization of Municipal Waste Combustion Ash, Ash Extracts, and Leachates; Executive Summary

530-R-95-036
Guidance for the Sampling Analysis of Municipal Waste Combustion Ash for the Toxicity Characteristic

530-SW-88-018
Hazardous Waste Incineration: Questions and Answers

530-F-94-021
Implementation Strategy of U.S. Supreme Court Decision in City of Chicago v. EDF for Municipal Waste Combustion Ash (Memorandum)

530-SW-88-024
Permitting Hazardous Waste Incinerators

530-F-95-013
Revised Implementation Strategy for City of Chicago v. EDF Municipal Waste Combustion Ash Supreme Court Memorandum

530-R-94-020
Sampling and Analysis of Municipal Refuse Incinerator Ash

530-R-94-044
Strategy for Hazardous Waste Minimization and Combustion

COMPOSTING

530-R-98-008
An Analysis of Composting as an Environmental Remediation Technology

530-F-97-047
Compost—New Applications for an Age-Old Technology - Kit Folder containing:

— **530-F-97-042**
Innovative Uses of Compost: Bioremediation and Pollution Prevention

— **530-F-97-045**
Innovative Uses of Compost: Composting Soils Contaminated by Explosives

— **530-F-97-044**
Innovative Uses of Compost: Disease Control for Plants and Animals

— **530-F-97-043**
Innovative Uses of Compost: Erosion Control, Turf Remediation, and Landscaping

— **530-F-97-046**
Innovative Uses of Compost: Reforestation, Wetlands Restoration, and Habitat Revitalization

530-R-97-003
Organic Materials Management Strategies

***530-F-92-012**
Environmental Fact Sheet: Recycling Grass Clippings

***530/SW-91-009**
Environmental Fact Sheet: Yard Waste Composting

EDUCATIONAL MATERIALS

— ***530/SW-90-024**
Adventures of the Garbage Gremlin: Recycle and Combat a Life of Grime (Comic Book)

— ***530-K-95-005**
Don't Trash It! Super Fun (Children's Activity Booklet)

— ***530/SW-90-005**
Let's Reduce and Recycle: A Curriculum for Solid Waste Awareness

— ***530/SW-90-025**
Recycle Today: Educational Materials for Grades K-12

— **530-B-97-004**
A Resource Guide of Solid Waste Educational Materials

— ***530/SW-90-010**
Ride the Wave of the Future: Recycle Today! (Poster)

— ***530/SW-90-023**
School Recycling Programs: A Handbook for Educators

EN ESPAÑOL

— **530-F-96-001S**
Cómo Obtener Acceso al Centro de Información Sobre la RCRA (Ley para la Conservación y Recuperación de Recursos)

— **530-F-92-031S**
Desechos Domésticos Peligrosos: Pasos para un manejo seguro

— **530-K-95-001S**
Entiendo los Reglamentos sobre Residuos Peligrosos: Manual para Empresas Pequeñas Actualización de 1996

— **530-F-96-025S**
Línea Informativa para la RCRA, el Superfondo y la EPCRA

— **530-F-96-004S**
Manejando Aceite Usado: Consejos para Empresas Pequeñas

— **530-R-96-007S**
Manual de Participación Pública de la RCRA

— **530-K-92-003S**
Manual del Consumidor para Reducir los Desechos Solidos

— **530-K-97-003S**
Medio Ambientes Delicados y la Ubicación de Instalaciones Para Manejo de Residuos Peligrosos

— **530-F-96-007S**
El Proceso de Permisos para Instalaciones de Residuos Peligrosos

— **530-F-94-008S**
Recolección de Aceite Usado para Reciclaje o Reutilización: Consejos para los consumidores que cambian ellos mismos el aceite y el filtro de aceite de su automóvil

— **530-F-95-030S**
Reglamento de Participación Pública Expandida de la RCRA

— **530-F-95-025S**
Reglamento de Residuos Universales

GENERAL

— ***530-F-97-017**
Environmental Fact Sheet: Electronic Access to OSW

— ***530-F-96-001**
How to Access the RCRA Information Center

— **530-C-97-006**
OSW Publications on CD-ROM

— ***530-F-96-025**
RCRA, Superfund, and EPCRA Hotline

— **530-R-98-004**
RCRA Orientation Manual

— **530-B-98-002**
Resources on Waste for Your Home and Community

HAZARDOUS WASTE

— **530-F-96-009**
Environmental Fact Sheet: Agency Reopens Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities

— **530-F-93-001**
Environmental Fact Sheet: EPA Issues Final Rules for Corrective Action Management Units and Temporary Units

Printed on paper that contains at least 20 percent postconsumer

530-F-96-010
Environmental Fact Sheet: Hazardous Waste Identification Rule for Contaminated Media (HWIR-Media)—Proposed Rule

530-F-97-013
Environmental Fact Sheet: Schedule Changed for Final Hazardous Waste Identification Rule (HWIR-Waste)

530-F-95-024
Environmental Fact Sheet: Proposal to Release Low-Risk Hazardous Waste From Regulation

530-F-92-027
Environmental Fact Sheet: The National Corrective Action Prioritization System

*530-F-96-007
Hazardous Waste Facility Permitting Process

*530-F-96-032
Hazardous Waste Requirements for Large Quantity Generators

530-F-97-029
Identifying Your Waste: The Starting Point

530-S-97-022
Biennial RCRA Hazardous Waste Report (Based on 1995 Data); Executive Summary

530-F-96-005
Passing the Torch: Streamlined State Authorization

*530-F-95-030
RCRA Expanded Public Participation Rule (Brochure)

*530-R-96-007
RCRA Public Participation Manual

*530-K-97-004
RCRA: Reducing Risk from Waste

530-K-97-003
Sensitive Environments and the Siting of Hazardous Waste Management Facilities

*530-K-95-001
Understanding the Hazardous Waste Rules: A Handbook for Small Businesses—1996 Update

*530-F-95-025
The Universal Waste Rule

HAZARDOUS WASTE MINIMIZATION

530-F-96-036
Environmental Fact Sheet: Standards Issued for Nonmunicipal Solid Waste Units that Receive CESQG Hazardous Waste

530-K-94-003
Review of Industrial Waste Exchanges

*530-SW-90-044
Waste Minimization: Environmental Quality with Economic Benefits

*530-R-94-045
Waste Minimization National Plan

530-F-97-010
Waste Minimization National Plan: Reducing Toxics in our Nation's Waste (Brochure)

530-F-97-028
Waste Minimization National Plan: Reducing Toxics in our Nation's Waste (Kit Folder)

HOUSEHOLD HAZARDOUS WASTE

*530-R-92-026
Household Hazardous Waste Management: A Manual for One-Day Community Collection Programs

*530-F-92-031
Household Hazardous Waste: Steps to Safe Management

*530-K-92-006
Used Dry Cell Batteries: Is a Collection Program Right for Your Community?

LAND DISPOSAL RESTRICTIONS

530-F-93-007
Environmental Fact Sheet: EPA Issues New Treatment Standards for Certain Ignitable and Corrosive Wastes

530-F-96-008
Environmental Fact Sheet: EPA Publishes Land Disposal Restrictions Treatment Standards

530-F-94-025
Environmental Fact Sheet: EPA Simplifies Land Disposal Restrictions by Establishing a Set of Universal Treatment Standards, and Finalizes Treatment Standards for 42 Newly Listed and Identified Wastes

530-SW-90-048
Environmental Fact Sheet: Milestone! Fifth Rulemaking Finalizes Land Disposal Restrictions

530-F-92-011
Environmental Fact Sheet: Treatment Standards Finalized for 20 Newly Listed Hazardous Wastes and Hazardous Debris

530-F-97-014
Environmental Fact Sheet: Treatment Standards Finalized for Wood Preserving Wastes; Less Paperwork Required Under LDR Program

530F-98-010
Environmental Fact Sheet: Treatment Standards Set for Toxicity Characteristic (TC) Metal, Mineral Processing Wastes, and Contaminated Soil

LANDFILLING

— *530/SW-91-089
Criteria for Solid Waste Disposal Facilities; A Guide for Owners/Operators

— 530-F-96-018
Environmental Fact Sheet: Assurance Mechanisms Finalized for Local Government Owners of Municipal Solid Waste Landfills

— 530-K-97-002
Financial Responsibility for Municipal Solid Waste Landfills

— 530-F-97-002
Geosynthetic Clay Liners Used in Municipal Solid Waste Landfills

— 530-F-97-001
Landfill Reclamation

— 530-R-96-006
List of Municipal Solid Waste Landfills

— *530/SW-91-092
Safer Disposal for Solid Waste; The Federal Regulation for Landfills

MEDICAL WASTES

*530-F-93-027b
Disposal Tips for Home Health Care (Patient Flyer)

*530-F-93-027a
Disposal Tips for Home Health Care (Professional Brochure)

*530-SW-90-089
Handle with Care: How to Throw Out Used Insulin Syringes and Lancets at Home; A Booklet for Young People with Diabetes and their Families

MUNICIPAL SOLID WASTE

530-R-98-007
Characterization of Municipal Solid Waste in the United States: 1997 Update

— 530-S-98-007
Characterization of Municipal Solid Waste in the United States: 1997 Update; Executive Summary

— *530-R-95-023
Decision-Makers Guide to Solid Waste Management; Second Edition

— *530-F-94-009
Environmental Fact Sheet: EPA Sets Degradability Standards for Plastic Ring Carriers

— *530-F-92-024
Green Advertising Claims

— *530-K-96-002
It's Easy Being Green! A Guide to Conducting Environmentally Aware Meetings and Events

— *530-K-93-001
Joining Forces on Solid Waste Management: Regionalization is Working in Rural and Small Communities

— *530-K-96-001
Making Solid (Waste) Decisions with Full Cost Accounting

— 530-C-97-001
MSW Factbook (Version 4.0) (3-1/2" diskette)

— *530-K-95-010
Planning for Disaster Debris

— *530/SW-89-051a
Report to Congress: Methods to Manage and Control Plastic Wastes; Executive Summary

— 530-S-95-008
Report to Congress on Flow Control and Municipal Solid Waste; Executive Summary

— *530-K-93-002
Reporting on Municipal Solid Waste: A Local Issue

— *530/SW-90-019
Sites for our Solid Waste: A Guidebook for Public Involvement

— 530/SW-89-019
Solid Waste Dilemma: An Agenda for Action

— 530-F-97-029
Solid Waste Funding: A Guide to Federal Assistance

NEWSLETTERS

— Native American Network

— Reusable News

— Strategy Update: A Newsletter on EPA's Hazardous Waste Minimization and Combustion Activities

— WasteWise Update

OIL AND GAS

530-K-95-003
Crude Oil and Natural Gas Exploration and Production Wastes: Exemption from RCRA Subtitle C Regulation

MUNICIPAL SOLID WASTE/ SOURCE REDUCTION

— *530-K-96-003
The Consumer's Handbook for Reducing Solid Waste

— *530-K-92-004
A Business Guide for Reducing Solid Waste

— *530/SW-89-015c
Characterization of Products Containing Lead and Cadmium in Municipal Solid Waste in the United States, 1970 to 2000; Executive Summary

*530-S-92-013
Characterization of Products Containing Mercury in Municipal Solid Waste in the United States, 1970 to 2000; Executive Summary

*530-F-96-038
Donating Surplus Food to the Needy

*530-B-97-001
Electronics Reuse and Recycling Directory

*530-F-96-037
Managing Food Scraps as Animal Feed

*530-R-94-004
Pay as You Throw: Lessons Learned About Unit Pricing

530-F-97-007
Pay-As-You-Throw Success Stories

530-F-96-028
Pay-As-You-Throw: Throw Away Less and Save

530-F-96-016
Pick-Up Savings: Adjusting Hauling Services While Reducing Waste

530-B-95-011
Source Reduction Bibliography

530-E-97-001
Source Reduction Program Potential Manual: A Planning Packet (contains manual listed below and ReduceIt: Companion Software)

530-R-97-002
Source Reduction Program Potential Manual: A Planning Tool

*530-K-95-002
Spotlight on Waste Prevention: EPA's Program to Reduce Solid Waste at the Source

530/SW-91-005
Unit Pricing: Providing an Incentive to Reduce Waste

530/SW-90-084a
Variable Rates in Solid Waste: Handbook for Solid Waste Officials; Executive Summary

*530-F-93-008
Waste Prevention: It Makes Good Business Sense

*530-K-92-005
Waste Prevention Pays Off: Companies Cut Waste in the Workplace

*530-R-92-015
Waste Prevention, Recycling, and Composting Options: Lessons from 30 Communities

530-R-95-044
WasteWi$e First Annual Progress Report

530-R-96-016
WasteWi$e Second-Year Progress Report

530-R-97-045
WasteWi$e Third-Year Progress Report

*530-F-94-006
WasteWi$e Tip Sheet: Facility Waste Assessments

*530-F-94-003
WasteWi$e Tip Sheet: Waste Prevention

530-F-94-002
WasteWi$e Tip Sheet: WasteWi$e Program Road Map

RECYCLING

530-B-97-014
Construction Products Containing Recovered Materials

530-F-97-049
Environmental Fact Sheet: EPA Expands Comprehensive Procurement Guidelines (CPG)

*530-F-95-010
Environmental Fact Sheet: EPA Issues Comprehensive Procurement Guideline

— *530-F-97-015
Environmental Fact Sheet: Recycling Municipal Solid Waste: 1995 Facts and Figures

— 530-F-92-014
Federal Recycling Program (Brochure)

— 530-R-96-004
Final Paper Products Recovered Materials Advisory Notice (RMAN): Response to Public Comments

— 530-F-96-039
A Financing Guide for Recycling Businesses: Investment Forums, Meetings, and Networks (Brochure)

— 530-R-96-012
A Financing Guide for Recycling Businesses: Investment Forums, Meetings, and Networks

— 530-R-95-077
Full Cost Accounting Resource Guide

— *530-F-94-007
How to Start or Expand a Recycling Collection Program (Fact Sheet)

— 530-K-97-009
Implementation of the Mercury-Containing and Rechargeable Battery Management Act

— 530-F-98-001
Jobs Through Recycling Program

— 530-B-97-012
Landscaping Products Containing Recovered Materials

— *530-R-95-001
Manufacturing From Recyclables: 24 Case Studies of Successful Enterprises

— 530-R-97-011
Measuring Recycling: A Guide for State and Local Governments

— 530-F-97-048
Measuring Recycling: EPA's Voluntary Standard Method (Brochure)

— 530-B-97-008
Mills that Manufacture Printing and Writing Paper, Computer Paper, Office Paper, Envelopes, Bristols, and Coated Printing and Writing Papers, Using Recovered Paper

— 30-B-97-010
Mills that Produce Newsprint Containing Postconsumer Recovered Paper

— 530-B-97-009
Mills that Produce Tissue Products Containing Recovered Paper

— 530-B-97-007
Miscellaneous Products (Pallets) Containing Recovered Materials

— 530-F-97-035
1997 Buy-Recycled Series: Construction Products

— 530-F-97-034
1997 Buy-Recycled Series: Landscaping Products

— 530-F-97-033
1997 Buy-Recycled Series: Non-Paper Office Products

— 530-F-97-031
1997 Buy-Recycled Series: Pallets (Miscellaneous Products)

— *530-F-96-014
1996 Buy-Recycled Series: Paper Products

— 530-F-97-032
1997 Buy-Recycled Series: Park and Recreation Products

— 530-F-97-036
1997 Buy-Recycled Series: Transportation Products

— 530-F-97-037
1997 Buy-Recycled Series: Vehicular Products

— 530-B-97-011
Nonpaper Office Products Containing Recovered Materials

— 530-B-97-006
Park and Recreation Products Containing Recovered Materials

— 530/SW-91-011
Procurement Guidelines for Government Agencies

— 530-K-97-008
Puzzled About Recycling? Look Beyond the Bin

— 530-F-98-003
Questions and Answers about Full Cost Accounting

— *530-F-92-003
Recycle: You Can Make a Ton of Difference (Brochure)

— 530-H-92-001
Recycle: You Can Make a Ton of Difference (Poster)

— *530-K-95-004
Recycling Means Business

— *530/SW-89-014
Recycling Works! State and Local Success Stories

— 530-R-93-013
Report to Congress: A Study of the Use of Recycled Paving Materials

— 530-R-95-042
Report to Congress: Recovery and Recycling of Plastics from Durable Goods

— 530-R-96-003
Summary of Comments on the Proposed Paper Products Recovered Materials Advisory Notice (RMAN)

— 530/SW-90-073b
Summary of Markets for Compost

— 530/SW-90-072b
Summary of Markets for Recovered Aluminum

— 530/SW-90-071b
Summary of Markets for Recovered Glass

— 530/SW-90-074b
Summary of Markets for Scrap Tires

— 530-B-97-013
Transportation Products Containing Recovered Materials

— 530-B-97-005
Vehicular Products Containing Recovered Materials

— *530-F-94-005
WasteWi$e Tip Sheet: Buying or Manufacturing Recycled Products

— *530-F-94-004
WasteWi$e Tip Sheet: Recycling Collection

TRIBAL/NATIVE AMERICAN

530-R-96-051
Grant Resources for Solid Waste Activities in Indian Country

530-F-97-019
Environmental Fact Sheet: It's 1997...

530-F-97-050
Partnerships in Solid Waste Management

530-F-97-051
Preparing Successful Grant Proposals

*530-K-95-006
Recycling Guide for Native American Nations

530-R-97-016
Site-Specific Flexibility Requests for Municipal Solid Waste Landfills in Indian Country: Draft Guidance

USED OIL

*530-F-94-008
Collecting Used Oil for Recycling/Reuse: Tips for Consumers Who Change Their Own Motor Oil and Oil Filters (Brochure)

*530/SW-89-039a
How to Set Up a Local Program to Recycle Used Oil

*530-F-96-004
Managing Used Oil: Advice for Small Businesses

*530/SW-89-039d
Recycling Used Oil: For Service Stations and Other Vehicle-Service Facilities (Brochure)

*530/SW-89-039b
Recycling Used Oil: What Can You Do? (Brochure)

PUBLICATIONS AVAILABLE FROM NTIS

Publications from NTIS can be ordered by calling 800 553-6847 or sending an e-mail to <orders@ntis.fedworld.gov>.

***PB91-111 484**
Charging Households for Waste Collection and Disposal: The Effects of Weight- or Volume-Based Pricing on Solid Waste Management

— ***PB94-163 250**
Composting Yard Trimmings and Municipal Solid Waste

— ***PB94-100 138**
Markets for Compost

— ***PB93-170 132**
Markets for Recovered Aluminum

— ***PB93-169 845**
Markets for Recovered Glass

— ***PB92-115 252**
Markets for Scrap Tires

— ***PB90-199 431**
Office Paper Recycling: An Implementation Manual

— ***PB90-163 122**
Promoting Source Reduction and Recyclability in the Marketplace

Paperless Publications

Many solid waste publications are available online at the Office of Solid Waste Web site, <www.epa.gov/osw>.

Publications marked with an asterisk are available on the OSW Publications CD-ROM. To order a copy, call the National Center for Environmental Publications and Information at 800 490-9198 or the RCRA Hotline at 800 424-9346.

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1996

BRYCE CANYON NATIONAL PARK

Statement of Work

Prepare an Integrated Solid Waste Management Plan

Introduction

Solid waste in Bryce Canyon National Park is generated in public use areas such as campgrounds, overlooks, lodging facilities, in employee operations and residential areas. Bryce Canyon has initiated a recycling and waste reduction program as part of their overall integrated waste management strategy. These programs are popular with the public, and in most cases, are a overall cost-saver when compared with disposal options. As park budgets tighten and disposal costs increase, it is clear that more must be done to ensure that the solid waste program is the most efficient possible in terms of cost, labor, requirements, and ease of use by the public and employees. It must be a practical plan, be doable for existing operations and also meet the needs of the future. Improvements can be made to prevent waste at its source, thereby reducing both materials use and expenditures on waste disposal and diversion programs.

The goal of this project is to identify and describe more economical, efficient, and environmentally sound waste management strategies for Bryce Canyon National Park and surrounding communities. Development of an Integrated Solid Waste Management Plan (ISWMP) will provide the management tool for this goal. The plan will analyze current operations, evaluate the costs of existing and proposed future solid waste/recycling systems, determine ways to reduce costs, and identify solid waste management options available for the future. This project will also focus on ways to simplify program management and promote the importance of public education and awareness of recycling and waste reduction programs in the park and surrounding communities.

The benefits of such improvements are multiple. A more efficient solid waste collection system will decrease litter and reduce costs. Changes in procurement practices can reduce the quantity of materials which are destined for the landfill (either through longer life or reduced quantities) needed. Modifications to collection frequency and improved processing and disposal will reduce vehicle congestion and reduce costs. With increased recycling participation, more materials will be diverted from landfills and the need for virgin materials will be reduced. The larger the volume of materials collected, the more cost effective the recycling program becomes, even without changes in collection patterns. With more efficient collection, either through improved routes or frequency, the costs of recycling are reduced and the social benefits of recycling are increased.

Scope of Work

Developing an ISWMP will include a review and cost analysis of the components of the current solid waste system in the park, including concessioner facilities and surrounding area. These components include source reduction, recycling, public education programs, trash and recycling collection, waste processing, and final disposal. Each of these systems is necessarily interrelated and cost improvements in one will likely affect other components.

The contractor will identify cost-effective integrated solid waste management strategies. The contractor will utilize past visitation and waste generation data for forecast future waste generation levels for the park. The contractor will evaluate waste composition, waste collection (routes, schedules, equipment and manpower), and waste disposal (equipment, manpower and materials). The contractor will then use waste stream data from other NPS facilities to determine potential recovery rates and identify the materials which are the best candidates for diversion (via recycling, composting, or waste-to-energy). Finally, the contractor may offer recommendations for improvements in the collection and disposal of trash and material recovery. As appropriate, the may include the preparation of cost and manpower estimates. All findings will be formulated in language that can be readily used in future solid waste and recyclable collection contracts issued by the park.

The contractor will evaluate waste reduction and recycling opportunities for the park and concessioner. The review will encompass both specific work practices and park-wide policies that promote waste prevention. The contractor will conduct walk-through site assessments and advise park and concessioner staff on techniques they can use to identify and evaluate additional waste prevention opportunities on their own.

The contractor will work with park procurement staff to discuss steps they can take to complement the parks' recycling/waste prevention program, as well as help them comply with the Executive Order mandating "GREEN" procurement. The contractor will also work with the park concessions specialist to discuss steps the park can take to enhance the recycling or waste prevention efforts of park concessionaires. These waste prevention/source reduction initiatives will be identified in the Integrated Solid Waste Management Plan (ISWMP).

The contractor will prepare an ISWMP for the park. The ISWMP format will follow the NPS Washington Office recently revised Managers Guide. The key requirements of an ISWMP include: a description of the current and projected waste collection and disposal system, the costs of the system (i.e., vehicles, manpower, collection and disposal frequency, container requirements, etc.) A description of feasible alternatives for solid waste management, the preferred strategy, and cost estimates and timelines for implementation of the preferred strategy. The work will be documented in a manner to allow for easy revision in the future.

The Project Coordinator will collect relevant data from the parks Maintimizer program, Resource Management staff, CCR, collection contracts, and other sources on the current monthly cost of waste and recycling management and on visitation and long-term park management plans. To the extent possible, NPS staff will also request information from the concessioner on the quantities and costs of each material managed by each concessioner. The contractor will provide the Project Coordinator with a list of data needs three weeks prior to the site visit. If this information is not available, the contractor will make informed judgements about the costs and quantities of waste handled by each of these systems.

The NPS Project Coordinator(s) will present the final ISWMP plan to park management. Park procedures will be followed for plan approval and implementation.

<u>On-site Visit</u>

The contractor will conduct a two-day visit to the park to collect data, meet with park and concessioner staff, and tour facilities. The contractor will set up this visit at least two weeks in advance and notify the following persons: Chery Schreier, Hazardous Waste Coordinator/Concessions Liaison and Project

Coordinator (801) 834-4103, NEW PERSON, Recycling Coordinator (801) 834-XXX, Richard Bryant, Resource Manager (801) 834-4900, Michael Castagnetto, Facility Manager and COTP (801) 834-4200. The Concessions Management Specialist will be notified of all meetings with park concessionaires. Any of these persons may accompany the contractor during the park visit.

The contractor will also conduct a presentation to park staff, residents, local communities, concessionaires, other parks and partners concerning the benefits or waste reduction and recycling as well as the economic advantages. A listing of these contacts is provided to assist in developing the ISWMP.

Work Products

the contractor will provide reports to the Contracting Officer's Representative (COTR) and Park Coordinator for each milestone listed in the attached table. These reports can be submitted by electronic mail.

Two written products will be produced: a draft and final ISWMP. In addition, the contractor will prepare briefing materials for meetings with park management. The final ISWMP will incorporate all park comments and edits as necessary and will be delivered at the end of the contract. The contractor will furnish to the Project Coordinator, Bryce Canyon national Park one hard copy of each of the draft and final ISWMP documents. Any special formatting, such as binding, table formatting, etc., if necessary will be performed by the NPS, and the contractor will provide one camera-ready copy of the document in this format.

The contractor will furnish to the park Project Coordinator a copy of the final ISWMP on 3 ½ 1.44 Mb disk. The disk will contain an index of material contained, labeled with the contractor's name, address, phone, project, contract number, and date. Word processing will be compatible to Word Perfect 5.1 format.

The project timeline is 120 days from Notice to Proceed to completion and submittal of the final ISWMP This timeline allows two weeks for NPS review of the draft ISWMP.

TOOLBOX 8

Markets

Regional Market Contacts

Southwestern Public Recycling Association (for Arizona, Nevada, Utah, Colorado and New Mexico)
P.O. Box 27210
Tucson, AZ 85726-7210
(520) 791-4069
(520) 791-5242 fax

State Market Contacts

Arizona:
Arizona Recycling Coalition
101 S. Central
Phoenix, AZ 85004
(602) 256-3170

Southwestern Public Recycling Association
Arizona Office
(520) 791-4069

Colorado:
Colorado Recycles
8745 W. 14th Ave, Suite 216
Lakewood, CO 80215-4850
(303) 231-9972

Southwestern Public Recycling Association
Colorado Office
(303) 640-7497

Montana:
State of Montana
Waste Management Division
P.O. Box 200901
Helena, MT 59620-0901
(406) 444-1430

New Mexico:
State of New Mexico
Energy, Mineral and Natural Resources Department
2040 S. Pachecho Street
Santa Fe, NM 87505
(505) 827-5993

Southwestern Public Recycling Association
New Mexico Office
P.O. Box 1645
Bernalillo, NM 87004
(505)867-3964

Oklahoma:
Oklahoma State Department of Health
1000 NE 10th
Oklahoma City, OK 73117-1299
(405) 271-7353

Texas:
Texas Natural Resource Conservation Commission
Recycling Section
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-6013

Recycling Coalition of Texas
3112 Canyon, Suite 200
Dallas, TX 75226
(214) 670-4475

Wyoming:
Wyoming Recycling Association
P.O. Box 539
Laramie, WY 82073
(307) 777-7752

Specific Materials Market Contacts

Glass:
Glass Packaging Institute
1627 K Street, N.W., Suite 800
Washington, DC 20006
(202) 887-4850
(202) 785-5377 fax

Glass Packaging Institute
4825 South Peoria, Suite 4
Tulsa, OK 74105
(918) 742-8343
(918) 742-8342 fax

Paper:
American Forest & Paper Association
111 19th Street, N.W., Suite 800
Washington, DC 20036
(202) 463-2700
(202) 463-2785 fax

Corrugated Packaging Council
(800) 879-9777

McKinley Paper Company
10501 Montgomery N.E., Suite 300
Albuquerque, NM 87111
(505) 271-7500
(505) 251-7510 fax

Weyerhaeuser
Recycling Business Headquarters
Federal Way, WA
(206) 924-2905
Colorado Collection Center
Denver, CO
(303) 297-2312
Oklahoma Collection Center
Oklahoma City, OK
(405) 670-1441
Texas Collection Centers
Carrolton, TX
(214) 418-1703
Grand Prairie, TX
(214) 988-0555
San Antonio, TX
(210) 662-0600

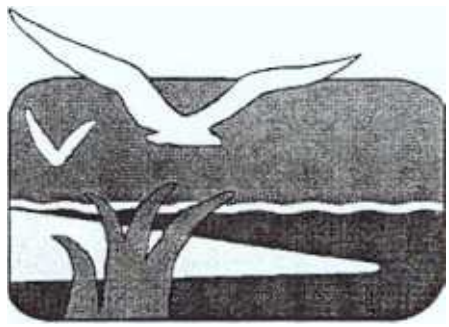
Plastic:
American Plastics Council
1801 K Street, N.W., Suite 701L
Washington, DC 20006-1301
(202) 974-5400
1-800-2HELP-90
(202) 296-7119 fax

NAPCOR
1420 5th Avenue, Suite 2200
Seattle, WA 98101
(206) 224-7464
(206) 224-2880 fax

Steel:
Steel Recycling Institute
823 Congress Avenue, Suite 104
Austin, TX 78701
(512) 472-3276
(512) 472-7026 fax

TOOLBOX 9

Sample ISWAP Plan



Integrated Solid Waste Management Proposal

For

Padre Island National Seashore

Recommended By: _____ Date: _____

Facility/Risk Manager, Padre Island National Seashore

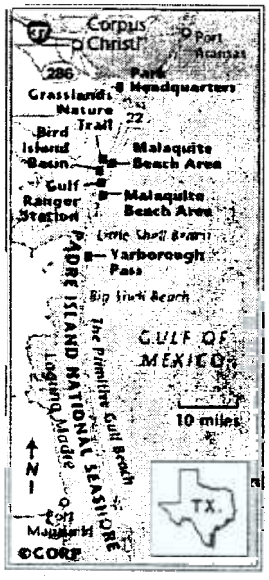
Approved By: _____ Date: _____

Superintendent, Padre Island National Seashore

Table of Contents

Park Information

Padre Island National Seashore is located along the south Texas coast. This sparkling preserve embraces 80 + miles of white sand and shell beaches, windswept dunes, wild landscapes of grasslands and tidal flats teeming with shore life. The national seashore is the longest primitive, undeveloped ocean beach in the United States.



This barrier island is a dynamic place where you can witness change wrought by the gentle touch of breezes, by the relentless crashing of waves, by the rhythmic coming and going of tides, and, most dramatically, by the violent battering of tropical storms and hurricanes. The many environments of Padre Island -- beach, dunes, grasslands, and tidal flats -- are shaped and reshaped daily in response to these natural sculptors.

The plants and animals of Padre Island are well adapted to the ever-changing nature of their native home. Many birds live here year-round or visit seasonally including numerous threatened and endangered species. Along the beach, you may see a nesting Kemp's Ridley turtle. This turtle, near extinction, has recently started to nest on the island. In the shallows of Laguna Madre, you may see flocks of white pelicans patrolling for fish. Inland, on the dunes and grasslands, you may see deer, coyotes, and rattlesnakes. The underwater life of the offshore waters of the Gulf of Mexico is just as abundant, as is that of Laguna Madre, a fertile nursery for saltwater fish.

The Malaquite Beach Pavilion, overlooking the Gulf of Mexico, serves as the center of visitor services for the National Seashore. This complex includes a visitor center, observation deck, groceries and gift shop, restrooms, rinse-off showers, and changing rooms. The visitor center has a wealth of information on what to see and do in the park.

Warm gulf waters and the hot Texas sun are ideal for swimming and sunbathing all year. Fishing is an all-season sport on Padre Island. Surf fishermen commonly catch redfish, speckled sea trout, and black drum in the Gulf, while in Laguna Madre fishermen pull in sheepshead and flounder.

Camping is permitted on seven-and-one-half miles of beach accessible by all two-wheel-drive vehicles and approximately sixty miles of beach accessible by four-wheel-drive vehicles south of the Gulf Ranger Station. There is also a paved campground with 42 sites located at Malaquite Beach and an unpaved campground at Bird Island Basin. Tent campers, trailers and recreational vehicles may use both campgrounds. Bird Island Basin also has a windsurfing rental. The Park's Concession is proposing a 100-site, full hook-up R/V Park, to open sometime in the year 2000.

Open year round, with annual visitation about 750,000. Peak visitation is during the summer, with other high visitation months being February and April when "Winter Texans" and spring breakers arrive. Climate: Winter, 54 to 70 degrees; Summer, 78 to 94 degrees; very high

humidity year round. Hurricane season is June through November. Lodging, gasoline and other amenities are available in nearby Corpus Christi, which is 25 miles from the Park entrance station.

Current Solid Waste Management Practices

Padre Island National Seashore collects approximately 81 tons of solid waste from operations, concessions, housing, and visitor use and camping activities at a cost of $101,000 per year.

However, the number one environmental issue and the largest waste-stream at Padre Island National Seashore is the hazardous waste that continually washes up on the 70+ mile shoreline. The main sources appear to be offshore oil rigs, the shrimp industry, United Mexican States, container and private vessels, and runoff from the Mississippi River and other tributaries. The beach remains to be a costly and daily clean up that last year alone cost $300,000.00 in hazardous waste removal.

With this program, we also collect about 1,200 plastic and metal containers, without contents annually at an additional cost of $6,000.00 in 40 yarder disposal fees.

Our hazardous or solid waste program does not include other types of marine debris, of unknown quantities, that are deposited on our beaches annually. These items, which typically are not removed due to the high costs involved, include onion sacks, plastic bags, 6-pack rings, metal, aluminum, light bulbs, fluorescent tubes etc. This other marine debris usually gets washed up to the dune line and eventually helps forms other sand dunes. The debris is effectively buried in a natural landfill, so to speak, but is then exposed periodically due to big storm events. Therefore, this debris is also another large environmental issue that we at Padre Island face.

Padre Island National Seashore also participates in annual beach clean-ups. This is a major source of the "Other" category. Some of the "Other" trash is also what visitors bring to the visitor center, deposit in dumpsters, etc. This is everything from rope, sand filled gallon jugs, fluorescent tubes, needles, flares, etc.

Waste Collection

Currently, Padre Island National Seashore uses one front loader packer truck operated by an Engineering Equipment Operator on an annual schedule, (see table below). Custodial staff empties containers in and around the Park, on a daily basis, into 20 centrally located 3.0 cubic yard dumpsters. Litter pick-up is performed on an as needed basis and prior to each grounds or roadside mowing, approximately 26 times per year.

Annual Waste Collection Schedule (Typical)	
September 15th through May 15th	Mondays or Fridays dependent on dumpster load
May 16th through September 14th	Mondays and Fridays regardless of dumpster load

Also, typically the Park has three beach clean-ups per year, April, May and September. These clean-ups generate an additional 40 tons per year, approximately. The trash is loaded into 40 yarders and transported to the landfill. The Park pays for approximately 25 tons of the disposal costs, the other costs are paid for by the Laidlaw or Garbage Gobbler as part of a community effort to clean-up Big Shell, a popular beach fishing site. This trash is not separated or recycled and it is unknown how much aluminum, plastic or other trash categories is generated during these annual trash pick-ups. In 1999, we plan to count trash as it comes to the 40 yarders in order to determine recylablity or resuse.

Locations of the dumpsters are four at South Beach Entrance, three at Malaquite Pavilion, three at the Campground, one at North Beach Entrance and four at Bird Island Basin. Forty yarders are located at the end of Ranger Road year round and are placed in Malaquite parking lot during the beach clean-ups.

Recycling Collection

The employee association operates a very limited program that collects only aluminum. In six weeks, that this program was being written, we collected 48 pounds of aluminum cans, which translates to 416 pounds per year. We do recycle some computer paper but no records have been kept as to the quantities. We keep getting requests from our Bird Island Basin windsurfing rental concessionaire to provide containers because of comments she gets from her clientele who would like to actively recycle.

Waste Disposal

Solid waste is transported approximately 30 miles, 60 miles round-trip, to the City of Corpus Christi Municipal Landfill. This material ends up in a landfill and is not used as an alternative source of energy nor is it separated for recycling. Tip fees average $24.00 per ton. We are unsure if and when the Corpus Christi landfill may close. If it does it could add almost 100 miles round trip to the next closest landfill, which is in Sinton, Texas. Tip fees at the Sinton dump are 21.00 per ton.

Cost of Existing System

Trash Collection (Labor)	45K
Litter Pick-up (Labor)	34K
Landfill Charges	2K
40 Yarder Fees	11K
Annual Trash Collection Equipment Depreciation	14K
Annual Maintenance Costs to Dumpsters and Trash Collection Equipment	13K
Annual Solid Waste Collection Costs	119K
121.31 Tons Collected in FY97 : Cost of Solid Waste Collection per Ton	1.0 K
Hazardous Waste Costs	300K
Total Park Collection Costs Annually	416K

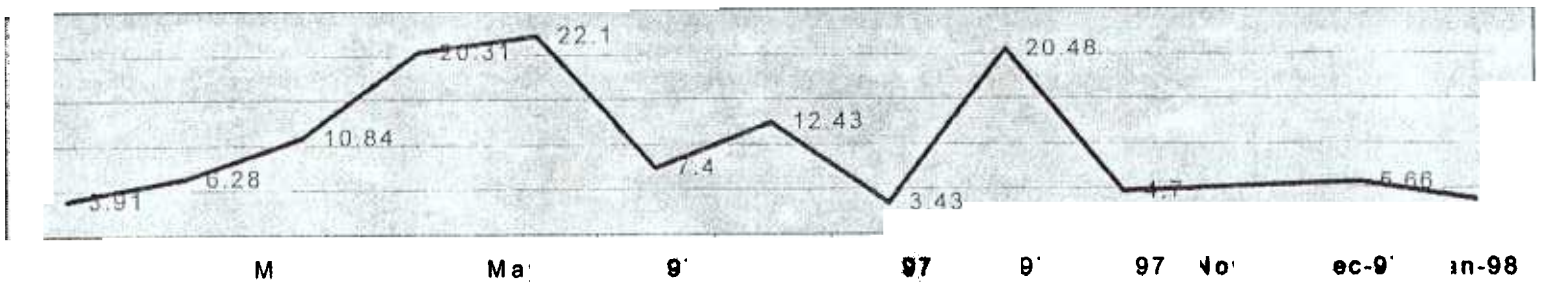
In summation, Padre Island National Seashore needs to get control of unchecked deposition of waste on our beaches because 40 yarder fees are almost 10% of the entire annual cost. 40 yarder fees are almost 90% beach trash. Padre Island National Seashore also needs to institute a formal recycling program.

Padre Island National Seashore Waste Generation Estimate

Date & Tons of Trash to the Dump		Paper	Plastic	Glass	Metals	Aluminum	Organic*	Other
1/5/98	3.77	0.65	0.47	0.5	0.44	0.49	0.61	0.61
12/1/97	5.66	0.92	0.74	0.77	0.71	0.76	0.88	0.88
10/31/97	4.70	0.78	0.6	0.63	0.57	0.62	0.74	0.74
9/30/97	16.23	0.71	0.53	0.56	0.52	0.55	0.69	12.67**
9/11/97	4.25	0.71	0.54	0.56	0.51	0.56	0.68	0.7
8/29/97	3.43	0.6	0.42	0.45	0.39	0.45	0.55	0.57
7/31/97	3.85	0.66	0.48	0.52	0.45	0.50	0.63	0.61
7/14/97	5.07	0.83	0.65	0.68	0.63	0.68	0.8	0.8
7/7/97	3.51	0.61	0.43	0.46	0.41	0.47	0.58	0.55
6/30/97	3.97	0.68	0.51	0.52	0.47	0.51	0.64	0.64
6/9/97	3.43	0.59	0.42	0.45	0.39	0.45	0.56	0.57
5/27/97	18.21	0.85	0.68	0.71	0.64	0.70	0.81	13.82**
5/8/97	3.89	0.66	0.48	0.53	0.45	0.51	0.64	0.62
4/18/97	20.31	0.87	0.69	0.72	0.66	0.71	0.83	15.83**
3/28/97	5.51	0.91	0.72	0.74	0.68	0.75	0.86	0.85
3/14/97	5.33	0.87	0.69	0.72	0.66	0.72	0.84	0.83
2/13/97	6.28	1	0.83	0.85	0.81	0.84	0.99	0.96
1/16/97	3.91	0.66	0.49	0.53	0.46	0.50	0.64	0.62
Annual PARK TOTALS	121.31	13.56	10.37	10.9	9.85	10.77	12.99	52.87

Notes: * = Organic = foodstuff, grass, etc. ** = Tri-Annual beach clean-ups. April May and Septemb

Solid Waste Tonnage by Month



Padre Island National Seashore Combined Waste Composition

	Beach Trash 72.18 Tons		Camping 26.32 Tons		Operations 14.37 Tons		Concessions 8.27 Tons		Combined Parkwide Tonnage Estimate	Combined Parkwide Percentage Estimate
Category	%	Tons	%	Tons	%	Tons	%	Tons		
Paper	3.9	2.84	12.3	3.22	45.9	6.42	12.8	1.06	13.54	11.10
Plastic	9.8	7.08	7.6	1.76	5	.70	9.7	.81	10.35	8.40
Glass	4.7	3.37	19.8	5.54	8	1.12	10.2	.85	10.88	9.02
Metals	3.3	2.26	14.4	3.79	14.4	2.01	21.3	1.77	9.83	8.10
Aluminum	3.9	3.49	11.7	3.05	15	2.45	21.9	1.76	10.75	8.92
Organic	9.2	6.61	19.1	5.0	2.3	.34	12.1	1.02	12.97	10.70
Other	65.2	46.53	15.1	3.96	9.4	1.33	12	1.00	52.82	43.62
							Sub-Totals		[illegible]	[illegible]
							Housing		[illegible]	[illegible]
							Park Totals		121.31	100%

Waste Generation and Composition Estimate: We arrived at this estimate because two dedicated employees did what is called "dumpster diving". This is the process of actually going into the dumpsters, removing and separating the trash into each category and then weighing the items by category. This was executed over a period of six weeks until we had a full load for the landfill. The tip fee receipts were researched for actual tonnage from February 1997 to February 1998. Then the load composition that went to the landfill was transposed over that same year's period of time to get our estimated annual waste generation and composition.

Diversion Rate: Our recycling program is a travesty with no organization and no records. However, during the research for this document over a period of six weeks we generated and recycled 48 pounds of aluminum cans. That translates to approximately 418 pounds per year, therefore we may have a .25 tons or 3% diversion rate.

External Influences on Future Solid Waste Management Practices

There are several factors that will affect the future of our solid waste management program. Some are regulatory, others are visitation, funding and finally Mother Nature.

Regulatory

- Resource Conservation and Recovery Act;
- Occupational Safety and Health Act;
- Executive Order 12873; Federal Acquisition, Recycling and Waste Prevention
- 36 CFR Part 6 –New NPS Solid Waste Rules

Visitation: Visitation to Padre Island National Seashore is approximately 800,000 per year. This number is due to increase based on present NPS trends, a planned 100-site R/V park with full hook-ups, and the numerous things that Padre Island National Seashore has to offer.

Visitors also expect recycling programs in Parks since the National Park Service is a leader in recycling and sustainable practices. Padre Island National Seashore does not have a recycling program. We do recycle some aluminum but we have no firm numbers. The one record we have says, we recycled 48 pounds of aluminum after a six-week period. We need to develop a formal Park recycling program.

Funding: Lack of funding and doing more with less has been the norm over the past decade in the National Park Service. We as managers have cut items and reduced other items in order to meet our budget. For instance, in the realm of solid waste we reduced the number of dumpsters in the Park; therefore, reducing the amount of time required for trash pick-ups. This has not developed into overloaded dumpsters and we have saved some money.

In order to run a successful recycling program, we must have the necessary start-up and maintenance funds. Recycling is not an arena where we want to place future budget manipulations.

Mother Nature: When Padre Island National Seashore gets storm events we get increased trash on our beaches. Although we can not do anything about storm events, we do need to plan contingencies to meet the resultant clean-ups head on. This might include emergency funding, bringing in equipment and containers, closing the beach until crews can remove the excess solid waste, either with volunteer labor, prison gangs or the National Guard. We have the responsibility to protect the visiting public and our natural resources from unknown and potentially dangerous items on the beach after a storm event.

Alternate Waste Management Strategies

For the purpose of this document we shall only discuss solid waste strategies, not hazardous waste. Our hazardous waste management program is in the process of an extensive overhaul which stands to save the Park and eventually the NPS $700,000.00 over the next five years.

Also for the purpose of this document, we will only discuss operational solid waste, not marine debris. We have a program which will continue, that is trying to identify the source of marine debris to stop it prior to beach deposition. We do have some goals at the end of the document that deal directly with both hazardous waste and marine debris.

- *Option 1: Continue as we are:* To the Park this is unacceptable. Visitation will rise, especially with the inclusion of the proposed 100-site R/V Park; therefore all solid waste related costs would increase, probably significantly.

- *Option 2: Further reduce the amount of Park dumpsters and initiate a pack-it-in - pack-it-out policy:* This may be a viable option. We have already cut our dumpster count almost in half. It has saved significant equipment repair and maintenance dollars since we pulled all the dumpsters off of the beach. Getting dumpsters emptied on the beach meant exposing our equipment to direct salt contact. The public was very understanding and there was no increase in bagged trash left on the beach. The visitors' removed their solid waste to dumpsters located at the two entrances to the beach. However, further reducing our dumpsters may have the opposite effect. Visitors are used to convenience. If there are not enough dumpsters we may see an increase in bagged trash being left around the Park therefore increasing removal costs. We would also have to redistribute dumpsters and add dumpsters during holidays and other peak periods.

- *Option 3: Contract entire recycling and solid waste removal out:* Contracting has been initiated in the past to no avail. Contractors in Corpus Christi do not want to travel the extra 25 miles to pick up dumpsters in the Park or if they do, they charge exorbitant prices. When the 100-site R/V Park opens, this may be a more viable option.

  Option 4: Initiate a recycling program reducing the amount of dumpsters by half per central location. Central locations with multiple dumpsters are 4 totaling 10 dumpsters: This is our preferred alternative. We will probably not reduce our labor costs but we should reduce our solid waste contribution to the local landfill. We do not know if the landfill will close any time soon. If it does, solid waste would have to travel an extra 100 miles round trip to the next closest landfill.

Options	Pro	Con	Cost
Option 1 Status Quo	- Equipment and staffing already in place - Park maintains control over operation	- Equipment sustains heavy damage from salt air and humidity - Dumpsters need to be painted and maintained frequently due to salt air and humidity - We do not know when the local landfill may close. If it does it would add about 100 extra miles to our round trip disposal	- $119,000.00 year
Option 2 Reduce dumpsters and policy	- We would further reduce our waste collection and disposal time - Equipment and staffing already exists - Trash collection may be faster therefore saving money - Park maintains control over operation	- Equipment sustains heavy damage from salt air and humidity - Dumpsters need to be painted and maintained frequently due to salt air and humidity - We do not know when the local landfill may close. If it does it would add about 100 extra miles to our round trip disposal - Parkwide litter will probably increase and dumpsters will probably over flow during peak periods	- Peak Period Dumpster Placement and Removal costs approximately $18,000.00 annually - 15% savings $90,650.00 - Increased litter collection approximately $11,000.00 - Total $119,650; $ 650.00 more than existing system
Option 3 Contract entire operation	- Eliminates damage to equipment - Eliminate health and safety concerns for employees - Frees up approximately 4,000 hours of labor that could be used elsewhere - Contractor assumes all liability	- Collection contract would be costly and not feasible until FY2000 when 100-site R/V park opens - Concrete pads and fences will need to be built and maintained for contractor's dumpsters - Dumpsters are much larger w/o lids making it easier for wildlife to get in and spread litter - Larger dumpsters make for more visitors dumping large trash items, e.g. mattresses, lumber, logs, drums, etc., therefore increasing tip fees - Park would see no possible revenue from recycling	- Contract costs about $155,000.00/year due to the distance to Corpus Christi - Pads and fences $4,000.00 per site X 12 = $48,000.00 - Maintenance costs per year, pads and fences $4,000.00 - Total $159,000.00; $41,000.00 more than existing system

Option 4 Start a recycling program	- We would further reduce our waste collection and disposal time - Most of the equipment and staffing already exists - Trash collection may be faster therefore saving money - Park maintains control over operation - Get visitor participation - Operation will be in place for 2 years ready for inclusion of 100-site R/V park	- Equipment sustains heavy damage from salt air and humidity - Dumpsters and recycle trailers need to be painted and maintained frequently due to salt air and humidity - We do not know when the local landfill may close. If it does it would add about 100 extra miles to our round trip disposal - Initial costs high	- Initial costs $50,000.00 estimated - @$5,350.00 per dumpster disposal rate annual costs would be $74,900.00 - Hauling costs to recycle center about $25,000.00 per year - Increased costs; maintain recycle trailers about $10,000.00 per year - Total $109,900.00; $2,900.00 more than existing system does not include any park pay back due to recycling

Proposal

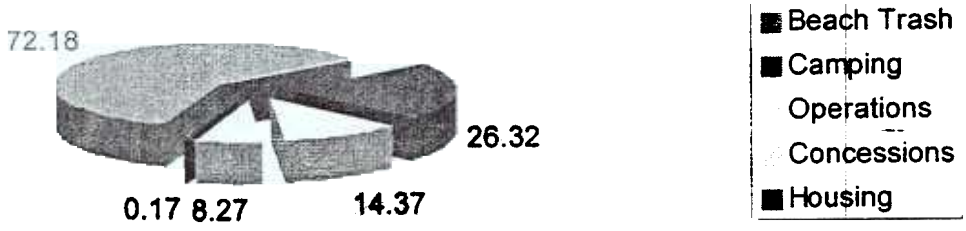
Padre Island National Seashore's Mission is to " Preserve, research, and interpret the critical habitat of one of the world's last undeveloped barrier islands for the recreation, benefit, inspiration and education of the public".

We have the responsibility to protect the numerous threatened and endangered species that live or migrate to our shores. We have the responsibility to protect our groundwater. We have the responsibility to protect the visiting public from the unknown materials that wash up on our otherwise pristine beaches. We also have a responsibility to properly manage the resources provided to us for the operation of this program.

Therefore, Padre Island National Seashore is going to start out slowly, with a recycling program for our known quantities of solid waste.

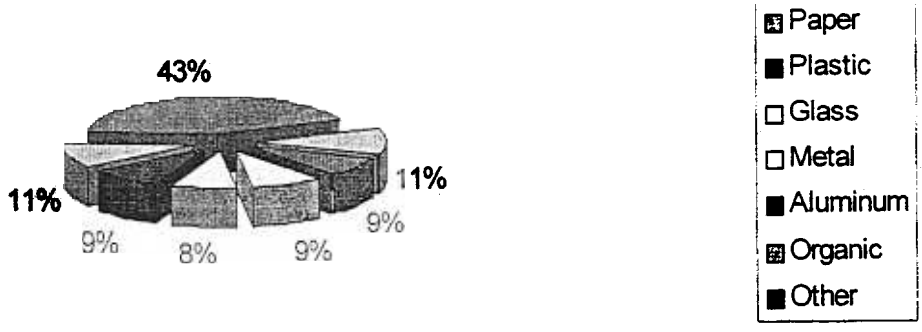
Of the 121 tons of solid waste generated by park staff, visitors and concessionaires, 72.18 tons is collected from beach ramp dumpsters or from beach clean-ups, 26.32 tons is collected from campground dumpsters, 14.37 tons from operations, 8.27 tons from concessions and .17 tons from housing.

Annual Tonnage of Solid Waste By Location



Of that tonnage, 55.4 tons or 46% of collected waste is composed of recyclable material, e.g. paper, plastic, glass, metals and aluminum. The other 54% is composed of organic and other. Of that, 13 tons is organic which could be composted and either given away or used in landscaping.

Percentages of Solid Waste by Type



Goals FY99 through FY01

⇒ Write and implement a Parkwide Recycling Program

- Place recycle bins/trailers at North Beach, South Beach, Malaquite Campground, BIB campground and Padre Island Company concessions. Bins and trailers will be for aluminum/paper/plastic and glass. Camping areas, concessions and operations areas will have a metal recycling bin.

- With beach clean-ups, we need to develop a standard to get the volunteers to separate the trash so that we might be able to recycle most of what comes off the beach.

- Work with local community to promote recycling fairs, scavenger hunts, etc

- Work with local news groups to promote the recycling program and promote community/NPS partnerships described above.

- Set up environmental education packages for local schools to promote recycling

- Look into composting for organic material and household food trash

⇒ Write and implement a Parkwide Pollution Prevention (P2) Program

- Get management and employee participation and identify source reduction and reuse opportunities for operations waste.

- Incorporate solid waste and pollution prevention tips along with hazardous waste deposition problems to visitors requesting information prior to visitation and after arriving in an effort to educate our visitors.

- In the new concession contract, require concessions to develop and implement a waste minimization and pollution prevention program and require annual reports to the park superintendent.

- Continue marine debris study to determine beach wash up sources

- Developed a program to reach out to the local community in an effort to stem the tide of pleasure boating trash and shrimp trash.

- Develop congressional ties to help with the national/international waste deposition

⇒ Evaluate programs annually and revise goals accordingly to move into the next millennium.

Resources & References

EPA Publication 530-K-92-004
Business Guide for Reducing Solid Waste

EPA Publication 530-SW-90-005
Curriculum for Solid Waste Awareness

EPA Publication A530-R-92-015
Waste Prevention, Recycling and Composting Options

FY99 SEPAS Submission - Type 53 Funding

Glass Packaging Institute Community Relations Publication
PR & Working with the Media, A Handbook for Recyclers

IMR Solid Waste Management Tool Kit

NPS Solid Waste Management Handbook

Recycling Centers

Atlas Recycling Inc	882-3734
BFI	882-1878
Commercial Metals Company	884-4071
Falcon Enterprises	718-2485
Gibson Recycling	882-4750
H & H Iron and Metal	888-5825
Laidlaw	883-9594
Planergy Inc	883-9515
Reynolds Aluminum	884-2296
Skips Industrial Salvage	299-1125
Team Recycling Services Inc	288-5500

Recycling Proposal for Everglades National Park

SOP's for Everglades, Big Cypress, and Biscayne Recycling Program